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THESIS

THE ART OF PEACE:
DISSUADING CHINA FROM DEVELOPING COUNTER SPACE WEAPONS

by

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June 2005

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This thesis assesses the viability of applying dissuasion towards the development of offensive counter space (OCS) systems by China. As a relatively new defense policy and certainly one that has never been explicitly applied previously, this thesis delves into the characteristics prescribed by recent U.S. planning documents to develop a strategy that more appropriately addresses the current security concerns. Implicitly, dissuasion is intended to prevent future arms races with China through well-placed U.S. actions that channel adversary efforts in a direction desired by Washington.

Several things become clear during this investigation. First, very little scholarly work exists discussing the concept of dissuasion and the mechanisms used to formulate, implement, and execute it as a defense policy. Second, that while an admirable attempt to lessen the need for more costly policy options such as deterrence and defeat, dissuasion will not prevent China from developing counter space weapons, especially since ground-based jammers that target satellite links have already proven effective. Third, the best chance of dissuading China's efforts to acquire space-based OCS systems is through international treaties and laws.

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THE ART OF PEACE:
DISSUADING CHINA FROM DEVELOPING COUNTER SPACE WEAPONS

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ABBREVIATIONS AND ACRONYMS

AEGIS	Airborne Early Warning Ground Environment Interface Segment
AOR	Area of Operations
ASAT	Anti-Satellite
BFT	Blue Force Tracker
BMD	Ballistic Missile Defense
C2	Command and Control
CAS	Close Air Support
CCD	Camouflage, Concealment, and Deception
CCS	Counter Communications System
CENTCOM	Central Command
CFR	Council on Foreign Relations
DCS	Defensive Counter Space
DoD	Department of Defense
DSCS	Defense Satellite Communications System
DSP	Defense Support Program
EMP	Electro-magnetic Pulse
ESA	European Space Agency
EU	European Union
FSW	Fanhui Shi Weixing
GEO	Geosynchronous Orbit
GPS	Global Positioning System

HET	Hall Effect Thruster
ICBM	Intercontinental Ballistic Missile
IntelSat	International Telecommunications Satellite Organization
ISR	Intelligence, Surveillance, and Reconnaissance
JFACC	Joint Forces Air Component Commander
LEO	Low Earth Orbit
MILSTAR	Military Strategic and Tactical Relay
NASA	National Aeronautical Space Administration
NDS	National Defense Strategy
NSS	National Security Strategy
OCS	Offensive Counter Space
OIF	Operation Iraqi Freedom
PACOM	Pacific Command
PGM	Precision Guided Munitions
PLA	People's Liberation Army
PRC	People's Republic of China
QDR	Quadrennial Defense Review
RWR	Radar Warning Receiver
SACC	Suppressing Adversary Counterspace Capabilities
SALT	Strategic Arms Limitation Talks
SAM	Surface to Air Missile
SATCOM	Satellite Communications
SDI	Strategic Defense Initiative
SSM	Surface to Surface Missile

START	Strategic Arms Reduction Treaty
UAV	Unmanned Aerial Vehicle
WMD	Weapons of Mass Destruction

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My father, Chief Master Sergeant (retired) John "Jack" Meteyer deserves mention as well. While writing I could not help but reflect on his time as an Airman carrying out the policies set forth in his era. Whether it was walking the line during the Berlin Airlift, setting up an expeditionary air base at Suwon during the Korean War, or quietly pushing the SR-71 out the door during the Vietnam Conflict. I hope I can serve my country with the same dedication and spirit.

Finally, I wish to recognize my children, Isabel, Jack, James, and baby Ave, who always make me smile and laugh. Of course, the greatest thanks go out to my wife, Jennifer, truly my best friend, greatest supporter, and the rock of our family.

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I. INTRODUCTION

A. BACKGROUND

Recently, several key U.S. planning documents have explicitly spelled out a defense strategy that "actively" pursues American security. While the traditional challenges of previous eras are not entirely gone, other challenges have sprouted that threaten U.S. interests. New strategies are necessary to counter these new challenges. In addition, new strategies incorporate lessons learned from the failures of past policies. The 2005 National Defense Strategy (NDS) advocates one such new strategy.

> We will work to dissuade potential adversaries from adopting threatening capabilities, methods, and ambitions, particularly by developing our own key military advantages.[1]

Furthermore, current U.S. leadership has explicitly identified one particular area of concern.

> In particular, Asia is gradually emerging as a region susceptible to large-scale military competition…Maintaining a stable balance in Asia will be a complex task. The possibility exists that a military competitor with a formidable resource base will emerge in this region.[2]

The clear implication of these two statements is that the U.S. must dissuade China, the only possible "military competitor" with a "formidable resource base," from developing systems that could target U.S. military strengths, above all in a Taiwan conflict, the issue on which U.S. and Chinese interests conflict most directly.

This thesis is concerned with the problem of dissuasion as it applies to Chinese space systems. Since 1979, the People's Republic of China (PRC) leadership has undertaken serious efforts to modernize the Red Army, although recent U.S. military operations starting with Desert Storm in 1991 and concluding in 2003 with Iraqi Freedom "stunned" the Chinese High Command with just how far behind they remain from

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[1] The National Defense Strategy (NDS) of the United States of America, Office of the Secretary of Defense (OSD), Washington DC. Mar 05, p. iv. http://www.defenselink.mil/news/Mar2005/d20050318nds1.pdf (accessed 19 May 05)

[2] Quadrennial Defense Review (QDR) Report, Office of the Secretary of Defense (OSD), Washington DC. 30 Sep 01, p. 4. http://www.defenselink.mil/pubs/qdr2001.pdf (accessed 19 May 05)

achieving the level of military might enjoyed by America. Consequently, the PRC modified its primary objective for the People's Liberation Army (PLA) from being prepared to execute a "people's war under modern conditions" to "winning a limited war under high-tech conditions."[3] A key component of this effort is the modernization of PRC space capabilities, which encompasses the ability to harness the advantages of space operations as well as deny those advantages to adversaries. Counterspace weapons such as ground-based satellite jammers constitute an especially fruitful area where China may seek to exploit U.S. weaknesses. These modernization efforts present an emerging threat to space systems upon which American military power is heavily dependent.

B. U.S. MILITARY'S DEPENDENCY ON SPACE

The evolution of space systems from unfunded pet projects of the late nineteenth and early twentieth centuries to WWII terror devices to Cold War nuclear war stabilizers caused space systems to take on specific missions. In fact, space systems such as the CORONA photoreconnaissance satellites and the Defense Support Program (DSP) missile warning spacecraft proved instrumental in supporting Cold War decision making and stability. Subsequently, these Cold War devices merged into U.S. conventional force operations and ultimately a strong dependency developed for the services provided by space systems. Yet, the fact that these devices were still relatively unknown and based on Cold War requirements caused many U.S. civilian and military leaders to recognize the potential for even greater improvements in air, land, and sea force effectiveness once newer space systems were acquired through a modern requirements process.

Therefore, remote sensing and other intelligence platforms, the global positioning system (GPS), weather satellites and satellite communications (SATCOM) all found their niche further embedded in the U.S. conventional force doctrine. Today multiple U.S. military documents, both joint and service specific, spell out the criticality of space in combat operations.[4]

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[3] David Shambaugh, *Modernizing China's Military: Progress, Problems, and Prospects*. (Berkeley, CA: University of California Press, 2004), pp. 2-3

[4] For a more thorough examination on the evolution of space systems see Appendix.

> This publication provides guidelines for planning and conducting joint space operations. It provides space doctrine fundamentals for all warfighters — air, land, sea, space, and special operations forces; describes the military operational principles associated with support from and through space, and operating in space; explains U.S. Space Command relationships and responsibilities; and establishes a framework for the employment of space forces and space capabilities.[5]

A number of data points underscore U.S. dependency on space as well as its integration into operations across the entire spectrum of U.S. forces. The GPS precision guided munitions (PGM) used in both Desert Strom and Iraqi Freedom demonstrates this point. In Desert Strom 8% of munitions were PGM[6], as compared to 68% in Iraqi freedom.[7] In addition to supporting PGM, GPS also aides in the prevention of fratricide, enhances close air support (CAS) employment, and fosters economy of force through successful blue force tracking (BFT) capabilities among other benefits.[8]

Satellite communications (SATCOM) usage levels also emphasizes the significant U.S. dependence on Space operations. U.S. reliance on satellite communications during Desert Strom was paltry: one Mbps per every 5,000 troops deployed. For Iraqi Freedom that number swelled to 51.1 Mbps.[9] The massive SATCOM bandwidth requirement supported such activities as Iraqi target imagery dissemination, Combined and Joint C2, Predator UAV data feeds, and Combatant Commander video-teleconferences.

Another data point to consider when discussing U.S. dependency on space is people. U.S. space requirements have grown at such a rate that several large and costly organizations have developed to handle these programs. For example, the lead agent for U.S. military space is Air Force Space Command, which is based out of Colorado

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[5] Joint Publication (JP) 3-14 Space Operations. The Joint Staff, Washington DC, 9 Aug 02, p. I, http://www.dtic.mil/doctrine/jel/new_pubs/jp3_14.pdf (accessed 19 May 05)

[6] "Operation DESERT STORM: Evaluation of the Air Campaign." Letter Report, Government Accounting Office (GAO)/NSIAD-97-134, 12 Jun 97

[7] Mosley, Michael, "Operation IRAQI FREEDOM – By the Numbers." Assessment and Analysis Division, U.S. Central Command Air Forces (USCENTAF), Shaw AFB, SC, 30 Apr 03

[8] French, Matthew, "General Points way to Better Blue Force." Federal Computer Week (FCW), 21 Oct 03. http://www.fcw.com/fcw/articles/2003/1020/web-oif-10-21-03.asp (accessed 19 May 05)

[9] Rayermann, Patrick, "Exploiting Commercial SATCOM: A Better Way." *Parameters*, Vol 33, No. 4 (Winter 2003-04), pp. 54-66. http://carlisle-www.army.mil/usawc/Parameters/03winter/rayerman.pdf (accessed 19 May 05)

Springs Colorado and consists of nearly 40,000 personnel.[10] These forces are responsible for a number of space operations that includes missile warning, satellite communications (SATCOM), and GPS operations. In addition, the entire functional combatant command of U.S. Strategic Command is dedicated to nuclear and space warfare. Lastly, the money trail for space acquisition implies that this realm of operations is every bit as important as air, land, and sea.

Consider that of the $60+ billion in major 2006 defense acquisition programs, from the F/A-22 to Patriot missiles to AEGIS destroyers, space programs account for over 10% of this budget. Or, consider that at $6.3 billion, space program procurement is more than twice that of the carrier replacement program, DD(X) destroyer, AEGIS destroyer, and littoral combat ship's combined expenses. And, the outlays for improved SATCOM systems will more than double that spent on the B-2, F-15E, and F-16 aircraft.[11] Opponents to increased space program funding can present logical arguments as to why limited defense dollars should concentrate elsewhere. However, at a minimum, the substantial amount of U.S. Department of Defense (DoD) funds earmarked for space programs represents a commitment by senior U.S. leadership that American forces will depend on these systems in future operations.

C. DESIGNING DEFENSE POLICIES

Figure 1 shows one possible approach to the cause-effect relationship between defense policies and strategic challenges facing the U.S. Since the first Strategic Arms Limitation Talks (SALT), the two superpowers recognized the futility of the nuclear arms race.[12] In essence, a limited number of nuclear weapons were agreeable between the two sides. As depicted in the top line of Figure 1, deterrence's affect is sufficient when directed towards other nuclear-armed states. The fact that no nuclear war has occurred

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[10] USAF Space Command Commander's Biography. Peterson AFB, CO, Jan 05. http://www.af.mil/bios/bio.asp?bioID=6232 (accessed 19 May 05)

[11] Department of Defense (DoD) Program Acquisition Costs by Weapon System, DoD Budget for Fiscal Year 2006. Comptroller for the Office of the Secretary of Defense (OSD), Washington DC, Feb 05, pp. 1-3. http://www.dod.mil/comptroller/defbudget/fy2006/fy2006_weabook.pdf (accessed 19 May 05)

[12] The following U.S. State Department links contain information on SALT:
http://www.state.gov/www/global/arms/treaties/salt1.html (SALT I),
http://www.state.gov/www/global/arms/treaties/salt2-1.html (SALT II), and
http://www.state.gov/www/global/arms/treaties/salt2-2.html (SALT II) (accessed 29 May 05)

supports this position. However, the consequence of nuclear arms reduction treaties like SALT and the Strategic Arms Reduction Treaty (START) is that more money is available for conventional or traditional types of forces.[13] Fortunately, from an American perspective, defense policies against these types of challenges are extremely effective since the U.S. conventional military possess such overwhelming strength. Yet, this causes another cascade of adversary money, although this time it is from traditional weapons to irregular or disruptive challenges such as insurgency or cyber warfare. Unfortunately, the U.S. has proven to be ill equipped to handle these types of challenges. It is for this reason that U.S. policy makers created the strategy of dissuasion in hopes that it can counter challenges not normally considered U.S. strengths.

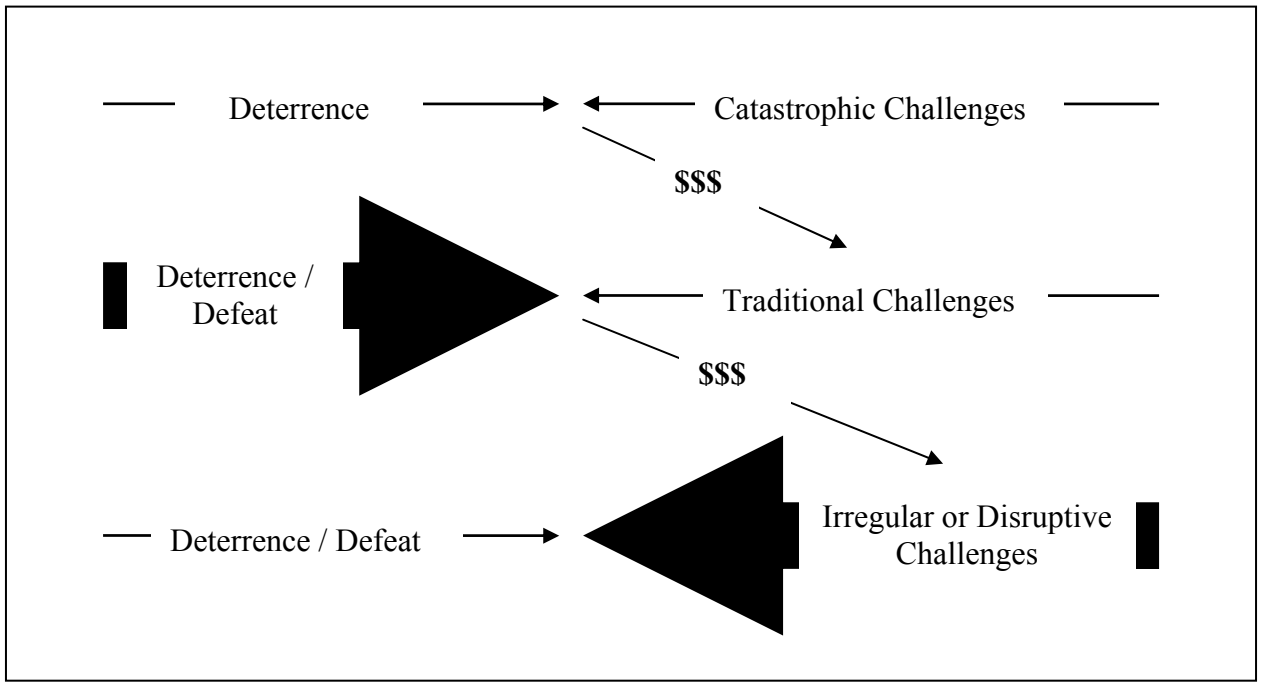

Figure 1. Relative Strength of Traditional U.S. Defense Policies versus Relative Strength of Strategic Challenges[14]

These factors are partially responsible for the policies outlined in recent U.S. documents such as the 2002 National Security Strategy (NSS), 2001 Quadrennial

[13] The following U.S. State Department link contains the complete START documentation: http://www.state.gov/t/ac/trt/18535.htm (accessed 29 May 05)

[14] The 2005 NDS describes the four "strategic challenges" in more detail.

Defense Review (QDR), 2005 National Defense Strategy (NDS), and 2004 National Military Strategy (NMS). In the end, these documents provide a framework for the various activities that support U.S. security like service budgets, military war planning, and foreign diplomacy. Dissuasion represents one specific defense policy prescribed by these documents. Chapter II analyzes this policy and highlights its key traits, but one issue is worth mentioning now. *The amount of literature and understanding on exactly what dissuasion entails or seeks to accomplish is extremely limited.* Of equal concern is the fact that none of the aforementioned U.S. policy documents provides any semblance of an executable strategy for this new concept. While not a conclusion that addresses the main question of this thesis, it is worth noting that as a policy prescription dissuasion requires much more discussion, analysis, and most importantly guidance from U.S. senior administrators in the DoD, State Department, and White House.

Nonetheless, it seems logical that the genesis of dissuasion reaches back to the Cold War and that one of this policy's targets is China's counter space technologies. Mindful of the large costs associated with the superpower stare downs of the twentieth century, the U.S. sought to develop a policy that avoids arms races before they have a chance to begin. Since the other mediums of operation already nurture on-going battles for improved air, land, and sea-based weapon systems, its application in those domains seems less apparent. In addition, many individuals, nations, and international groups are against the weaponization of space. Conversely, the international community does not view the buildup of improved tanks, airplanes, and ships as illegal. Moreover, no known destructive weapons exist in space. Speculation as well as research and development programs are looking at weapons that could orbit the earth and actually destroy other satellites or fire lasers back onto earth. However, when compared to its more mature counterparts, space is relatively free of weapons. This sanctity appeals to some and provides impetus to keep space free from destructive systems.

D. ROADMAP

This main chapters of this thesis fall into three distinct sections. Chapter II discusses in more detail why dissuasion is a defense policy option and its objective as a military strategy. This chapter relies heavily on deterrence literature and logic in establishing the foundation of dissuasion. At times the line between deterrence and dissuasion may seem unclear, and while this chapter may not necessarily clear up this confusion it will at a minimum analyze and identify the similar traits of these two defense policies. Furthermore, this chapter traces the roots of dissuasion through recent historical security issues confronting the U.S. and its allies to provide a sense as to why U.S. policy makers are promoting this new policy. The conclusion of Chapter II summarizes why dissuasion is not just a U.S. defense policy in a broad sense, but why U.S. policy makers considered it the ideal choice to tackle the potential threat of Chinese counter space systems.

Chapter III analyzes China's space program. To accomplish this objective, this chapter introduces some basic concepts to space operations, such as the primary elements that comprise a space system. Understanding the basic elements of a space system is necessary for any policy that seeks to protect space systems. Simply protecting one element may not be enough to guarantee access to the space capabilities the U.S. has come to enjoy. Next, this chapter explores the difficulty of dissuading space systems and more specifically, why the dissuasion of counter space weapons represents the most probable chance for success. Finally, Chapter III examines the current space weapons China is likely to possess or seek to develop in the future.

Chapter IV uses past strategic cases as well as current defense policy theories to propose conditions necessary for dissuasion to succeed. In essence, these conditions for success are broken down into military, economic, and diplomatic conditions with each one containing multiple sub-conditions or criterion. Aside from the conditions presented, this chapter emphasizes that the prospects for dissuasion to succeed cannot be easily computed like a linear equation. Even though this thesis develops logical situations

where dissuasion may work, it is much more difficult to account for the actual decision-making and reaction to decisions made by state's leaders. In essence, judgment and risk are crucial components of any policy.

Chapter V assesses the prospects for success in dissuading China's counter space systems. *Unfortunately, the answer to this dilemma is that dissuasion will not succeed in stopping the Chinese from producing these types of systems.* However, the concluding chapter as well as entire thesis takes the reader through an in-depth and honest analysis that ultimately produces this result.

II. DISSUASION

A. BACKGROUND

Like other political options, defense policies represent one set of tools to advance and protect U.S. interests. Reflection and analysis of the past contributes to the policy process by allowing U.S. leaders to revise policies to better address current and future security requirements. One way to communicate these updates is through formal U.S. strategic policy documents, such as the National Security Strategy (NSS) and Quadrennial Defense Review (QDR). For example, the 2002 NSS issued by President Bush set a new course for U.S. policy makers.

> Today, the United States enjoys a position of unparalleled military strength and great economic and political influence. In keeping with our heritage and principles, we do not use our strength to press for unilateral advantage. We seek instead to create a balance of power that favors human freedom; conditions in which all nations and all societies can choose for themselves the rewards and challenges of political and economic liberty.

Portions of this recent guidance call upon older policies that have proven successful in the past while simultaneously advocating for the implementation of a new policy to address the changing dynamics of the twenty first century. Consequently, the next statement made by President Bush in the NSS provided clear direction for future U.S. defense policies.

> We will defend the peace by fighting terrorists and tyrants. We will preserve the peace by building good relations among great powers. We will extend the peace by encouraging free and open societies on every continent.[15]

While these three statements do not explicitly refer to the concepts of assurance, dissuasion, deterrence, and defeat, they do make a strong case for them. The U.S. will "defend…by fighting," "preserve…by building," and "extend…by encouraging." These ideas provide a departure point for subsequent and more specific defense planning

[15] The National Security Strategy (NSS) of the United States of America, The White House, Washington DC, 17 Sep 2002, p. iv, http://www.whitehouse.gov/nsc/nss.pdf (accessed 8 May 05)

guidance. Clearly, the more traditional defense policies of assurance, deterrence, and defeat resonate in the terms "defend" and "preserve." However, the notion of "extend[ing]" the peace through "encouraging" friendly atmospheres is a pillar of the relatively new defense policy called dissuasion.

B. WHY DISSUASION?

Recognizing the risk of provocation that comes with policies such as deterrence is one factor that caused U.S. leaders to re-examine past policies in search of something that better achieves a more productive relationship between states. Security studies expert Patrick Morgan summarizes the common distractions and unintended consequences of deterrence.

> We do not want deterrence to work in such a way that it is provocative and produces, rather than prevents, disastrous conflicts – which are the stability problem in its various forms…We do not want deterrence to shape the endless security dilemma…We do not want deterrence to drive out the alternatives that are available for the better management of global, regional, and national security.[16]

Unfortunately, at times, other less aggressive policies have also proven counterproductive. The most notable being the appeasement policies of pre-WWII. Designed to quell the aggressive interests of Hitler and his Nazi regime, appeasement simply provided Germany unfettered opportunities to deepen its pre-war buildup. Historian Gordon Craig analyzes the negative consequences of appeasement

> Germany truly intended on being naughty and she would go on being so as long as there was no compelling reason to change her ways…In September 1938 Hitler was well on his way to realizing the program laid down on 5 November 1937; and there seemed no possibility after Munich that anyone would object seriously to future depredations.[17]

The disaster of WWII serves as a frightful reminder that even non-aggressive approaches can also contribute to unsatisfactory policy results. Placing these two policies on a spectrum as shown in Figure 2 illustrates that room exists for a policy that lies

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[16] Patrick Morgan, *Deterrence Now*. (Cambridge, UK: Cambridge University Press, 2003), pp. 286-287

[17] Gordon Craig, "High Tide to Appeasement: The Road to Munich 1937-1938." *Political Science Quarterly,* Vol. 65 No. 1 (March 1950). pp. 20, 37

somewhere between the two. A policy in this area could possibly better address some of the indeterminate security requirements currently facing the U.S. Dissuasion may represent the most appropriate tool for dealing with states that fall between outright adversary and close ally. In addition, dissuasion affords leaders a more viable option for an exit strategy, a classic criticism of deterrence-based policies, should the intended target state respond favorably with peaceful assurances.

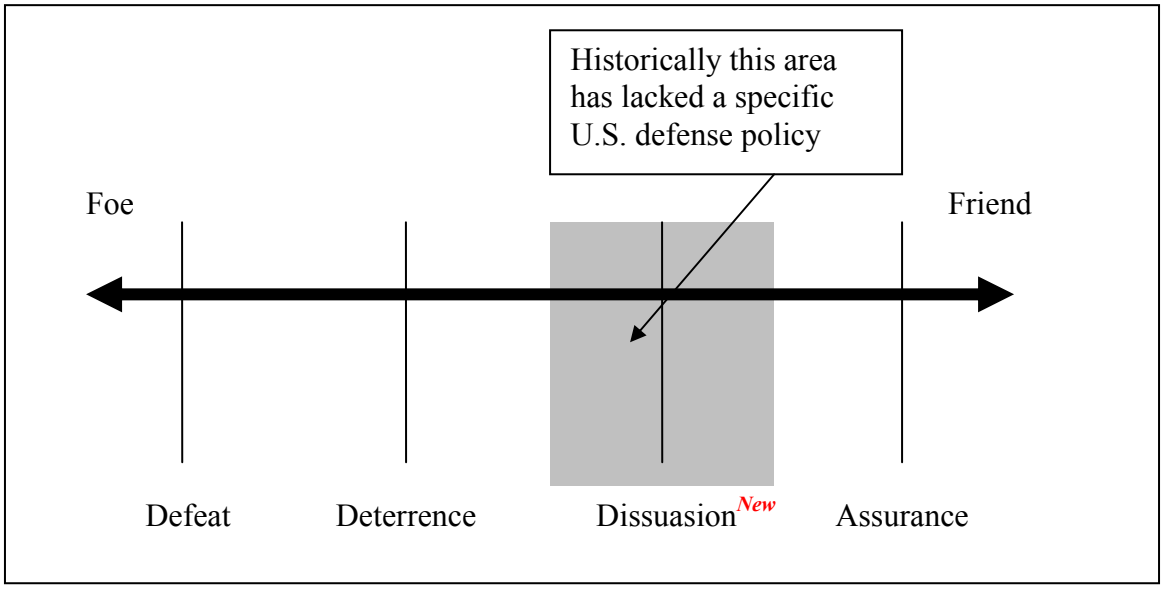

Figure 2. Defense Policy Spectrum

In light of these reasons, among others, the 2002 NSS of the U.S. dictates the use of dissuasion.[18] Moreover, the 2001 QDR, 2004 National Military Strategy (NMS), and 2005 National Defense Strategy (NDS) echo the same strategic methods as the NSS and clearly identify dissuasion as a defense policy.[19] As such, U.S. civilian and military leaders are directed to implement dissuasion when and where necessary.

C. THE TARGETS OF DISSUASION

The targets of U.S. defense policies can be broken into three types of threats: emerging, existing, and engaged. Ideally, as depicted in Figure 3, a specific defense policy counters each of these threats. However, a distinguishing characteristic is that

[18] 2002 NSS, p. 29

[19] 2001 QDR, pp. 11-12; 2004 National Military Strategy, Joint Chiefs of Staff, DoD, Washington DC, pp. 2, 9, 1, http://www.defenselink.mil/news/Mar2005/d20050318nms.pdf (accessed 19 May 05); 2005 NDS, pp. iv, 7

policies other than dissuasion all represent strategies aimed at current security situations. The U.S. assures its allies that it will support them against "existing" aggressive regimes, the U.S. deters "existing" adversaries from attempting coercion or harmful influence, and when necessary the U.S. defeats "existing" enemies on the battlefield. Conversely, according to the 2005 NDS, the U.S.

> Seeks to limit would-be opponent's strategic options and dissuade them from adopting threatening capabilities, methods, and ambitions.[20]

This explains a unique quality of dissuasion, that as a defense policy it seeks to reduce the likelihood that new adversaries will "emerge" or if they do "emerge" that they will be equipped with less capability. This is consistent with the overall guidance put forth by Secretary of Defense Rumsfeld

> This strategy emphasizes the importance of influencing events before challenges become more dangerous and less manageable.[21]

This is a clear reflection on the difficulties associated with past U.S. defense policies and the common security dilemmas that transpired from previous deterrence-focused strategies whose foundations were based on waiting for threats to develop first, then engage second. Robert Kaplan describes this situation as "deterring China without needlessly provoking it."[22] Moreover, the current commander of the U.S. Pacific Command, Admiral Fallon, recently appeared before the House Armed Services Committee and discussed the delicate nature of China-Taiwan relations and the role that U.S. influence may play in "diffusing the tension and moving forward."[23]

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[20] 2005 NDS, p. 7

[21] Ibid, p. iii

[22] Robert Kaplan, "How We Would Fight China," The Atlantic Monthly, Vol 295, Issue 5, June 05, p. 54

[23] "Counterterrorism, Military Readiness Among Top U.S. Priorities," US Federal News, Washington, 4 Apr 05

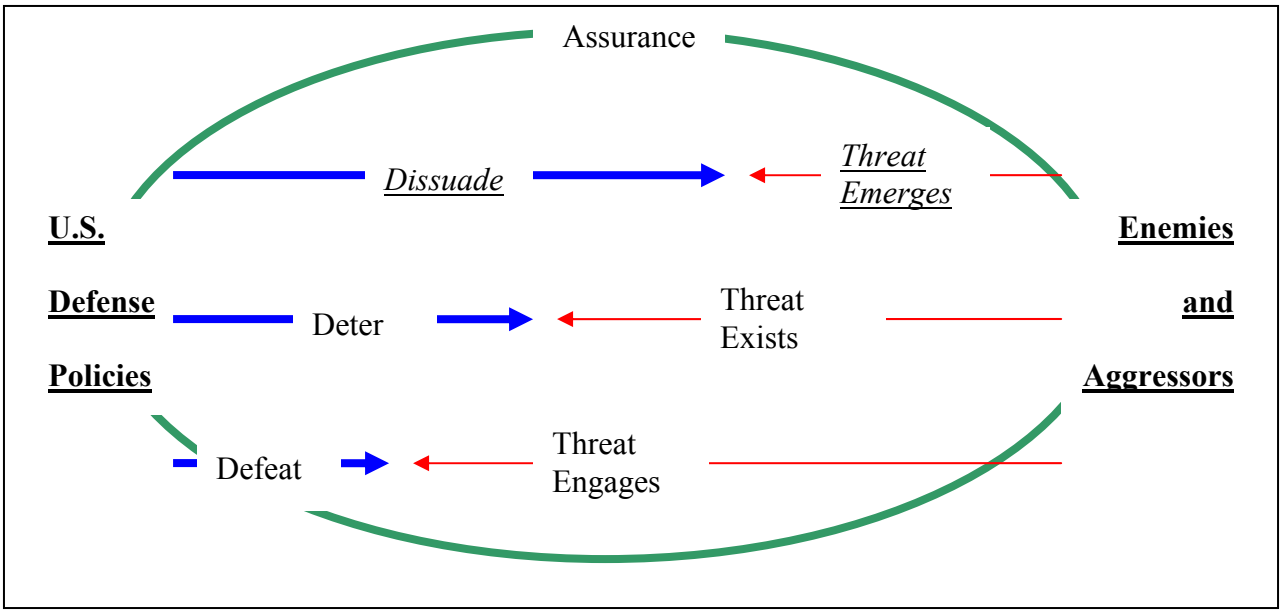

Figure 3. U.S. Defense Policies and Respective Targets

	Objective	Target	Measure of Effectiveness
Assurance	Convince Allies U.S. Will Deal With Threat	Allies and Enemy	Allies Avoid Arms Race
Deterrence	Stop Threat	Existing Threats	Threat Held in Check
Defeat	Eliminate Threat	Engaged Threats	Threat Surrenders
Dissuasion	Reduce Threat	Emerging Threats	***Threat Never Develops***

Table 1. U.S. Defense Policy Breakdown

Until dissuasion, no policy goal explicitly sought to reduce the number of threats, whether the threats exist at the strategic, operational, or tactical levels. Instead, they were designed to simply deal with threats at hand. Assurance, deterrence, and defeat assume that the U.S. will always have dangerously armed belligerents to manage. On the other hand, successful dissuasion may reduce the need for the other defense policy goals. Furthermore, policies often work best when integrated into a cohesive strategy that taps into the unique attributes of each specific policy. It is hard to imagine dissuasion working properly without the support of deterrence, assurance, and defeat, especially given the highly complex nature of the global environment. In fact, a broad strategic plan

that uses the wide-ranging utility of multiple defense policies is more likely to meet the diverse challenges of current security situations.

For example, the U.S. conventional and nuclear capabilities immediately following WWII served notice to any aggressor that America possessed the means to defeat even the most well armed nation. Combined with the assurance policies of the U.S. to its NATO partners the collective power of these two policies (assurance and defeat) created a more favorable environment for deterrence. However, this logic also bolstered the Soviets deterrence policies. The USSR demonstrated credible defeat-type qualities during WWII and the subsequent force build-up in Eastern Block countries assured the U.S. and others that the USSR was committed to the region. Consequently, these policy attributes afforded the Soviets certain degrees of credibility from which their deterrence policies could more effectively operate.

D. DEFINING DISSUASION

To understand the benefits of dissuasion better it is useful to compare it against other defense policy goals to highlight its unique attributes. Some of this comparison already took place in the introduction to this chapter. However, in addition to the nature of the relationship and the intended policy set, additional discussion will help to differentiate between dissuasion and its older counterparts.

1. Defeat

On one extreme of the U.S. defense policy spectrum is defeat (reference Figure 2), which represents the least desirable and most costly option. Yet, to uphold treaty obligations and prevent

> The efforts of adversaries to impose their will on the United States, its allies, or friends

Defeat may be the only option left that will preserve national security.[24] WWII, Korea, and the first Gulf War all represent examples of the U.S. carrying out defeat-based defense policies, some more successfully than others. In addition, U.S. policy towards each of these conflicts carried with it specific policy objectives. WWII represented unlimited warfare with only the unconditional surrender of the Axis powers (i.e.,

[24] 2001 QDR, p. 13

"traditional" strategic challenges) satisfying U.S. objectives. The first Gulf War had more limited objectives, which arose primarily from the diverse interests of states that comprised the fragile coalition. Nonetheless, the Gulf War still sought the defeat of a "traditional" type of strategic threat.

More recently, Operation Iraqi Freedom (OIF) was conducted as part of a broader defense policy to defeat a "traditional" threat, although a primary objective of OIF was to reduce the number of "catastrophic" threats (i.e., WMD) in the Middle East. Unfortunately, one unintended consequence of OIF is the increase in the number of "irregular" (i.e., insurgency and terrorism) threats in the region.[25] This highlights a consequence of U.S. military superiority in that it drives allies and adversaries to pursue means of warfare that avoid this strength by targeting a weakness (i.e., asymmetric warfare).

2. Assurance

On the opposite end of the defense policy spectrum (reference Figure 2) is assurance. According to the 2002 NSS and 2001 QDR, the U.S. will "assure our allies and friends" that they do not stand alone in the face of aggression or other potential threats.[26] Specifically,

> The U.S. military plays a critical role in assuring allies and friends that the Nation will honor its obligations and will be a reliable security partner.[27]

The U.S. position within NATO during the early years of the nuclear arms race provides a good example of this type of defense policy goal. By providing economic aid, conventional forces, as well as nuclear weapons, the U.S. demonstrated its commitment to stand by its NATO allies who were facing Soviet conventional and strategic forces. Consequently, the strong assurances provided to these Western European states allowed them to feel more protected, allocate sparse resources towards other programs, and bolster the U.S.'s position as a provider of global security.

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[25] 2005 NDS, p. 8

[26] 2002 NSS, p. 29 and 2001 QDR, p. 11

[27] 2001 QDR, p. 11

The Taiwan Relations Act of 1979 represents another U.S. assurance policy aimed at reducing the likelihood of a regional security dilemma. In response to the ebbs and flows of the historic China and Taiwan reunification conflict, the U.S. enacted a policy that assured Taiwan that they did not stand alone in the face of forceful attempts to reunify.[28] Furthermore, the policy provided "reassurance through restraint" that the U.S. would support peaceful resolutions with respect to China – Taiwan relations, but would act defensively if deemed necessary. Combined with the power projection capabilities of the Pentagon, and the most recent defeat of aggressive regimes (i.e., Milosevic and Hussein) by U.S.-led forces, American policies with respect to the China – Taiwan issue carry a great deal of credibility.

Assurance is about building and fostering productive relationships in an effort to bolster economic, diplomatic, and other non-military type activities. In addition, even though there is a military aspect to assurance policies, it is not an "in your face" type of involvement. Instead, it lurks behind the scenes while other strategic actions take front stage. One only needs to examine the highly productive relationship that exists between the U.S. and its closest allies to see the potential of assurance. Interestingly, the U.S.-Japan and U.S.-German assurance policies since the end of WWII have allowed both Japan and Germany to grow into modern industrial and intellectual giants. Of course, prior to WWII both of these states were strong geopolitical powers, but the aggressive nature of each state put it at odds with the U.S. Therefore, assurance sees competing interests much more like a win-win situation and not a zero-sum equation.

3. Deterrence

Unlike defeat and assurance, which lay on the outer edges of the defense policy spectrum, deterrence is closer to the middle, although it leans more towards defeat than assurance (reference Figure 2). In addition, when states start to consider deterrence type policies then the win-win potential of assurance quickly dissolves into a lose-lose scenario. Granted deterrence can prevent wars of monumental costs from taking place, but it simply does not allow for the productive type of relationships that exist under

[28] Taiwan Relations Act, Public Law 96-8, 96th U.S. Congress, 10 Apr 79, http://usinfo.state.gov/eap/Archive_Index/Taiwan_Relations_Act.html (accessed 8 May 05)

assurance. Nonetheless, deterrence served as the U.S. military's primary objective during much of the Cold War. With both superpowers arraying vast arsenals of nuclear weapons at each other neither one was prepared to accept the consequences of atomic warfare, in effect, the weapon systems and political policies of each nation deterred nuclear war as well as WWIII. The 2001 QDR defines deterrence as

> A multifaceted approach…that requires forces and capabilities that provide the President with a wider range of military options to discourage aggression or any form of coercion.[29]

Using terminology from the 2005 NDS, the design of Cold War defense policies primarily deterred the "catastrophic" challenges presented by nuclear weapons.[30]

Lawrence Freedman stated in his 2004 book titled *Deterrence* that in the past

> Deterrence anticipated aggression, and therefore guarded against being caught by surprise, but it could still be presented as essentially reactive.[31]

One only needs to look at the action words of this description to get a sense of when and against whom to apply deterrence. "Aggression" implies an adversarial state while "guarded," "surprise," and "reactive" detail a situation of insecurity where states mass forces along the border because of the distrusting or competing nature of the environment.

This highlights two key assumptions when constructing deterrence policies. First, that the target of deterrence is hostile or aggressive towards U.S. interests. Second, that the aggressive behavior is known and consists of military forces arrayed within striking distance from those interests. If hostilities have already commenced the value of deterrence lessens. If two states are close allies then this policy seems to have minimal utility.

According to Freedman there are two approaches that deterrence can take which will influence behavior. It can either prevent adversary action through denial or

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[29] 2001 QDR, p. 12

[30] 2005 NDS

[31] Lawrence Freedman, *Deterrence*. (Malden, MA: Polity Press, 2004), p. 11

punishment. This is similar to the carrot and stick analogy where a state will either be denied the carrot or punished with the stick, although neither seems very appealing which underscores the objective of deterrence. Efforts by states to not recognize or negotiate with terrorists are examples of a denial-based deterrence approach. The idea is that a state withholds from the aggressor something they want in order to prevent or deter the aggressor from taking undesirable actions. In the case of terrorism, the U.S. hopes that terrorists will avoid carrying out certain actions because the international community will prevent them from joining its organizations if they do. Conversely, deterrence by punishment is based on the notion that the costs of action outweigh any potential benefits (i.e., you'll suffer more than its worth).[32] This is the more common application of deterrence and embodies the main precept of nuclear deterrence. Neither superpower was willing to risk nuclear war because the economic, political, and domestic costs far outweighed any conceivable gains made by destroying the other side. This also serves to illuminate the confrontational nature of this policy, which Patrick Morgan summarizes in the following statement.

> Yet deterrence remains an important tool for failed relationships and communities – it is not ideally our first choice, but more like a recourse.[33]

The numerous instances of deterrence and not just nuclear deterrence provide more of the same confrontational brinksmanship.

In the historical application of deterrence, three common criteria are evident: an effective military capability, the capability to impose unacceptable costs, and the willingness to use these capabilities if attacked.[34] These criteria re-enforce the hostile nature of deterrence, the security dilemma that it usually creates, and ultimately the unproductive diplomatic environment fostered by such a strategy. Security expert Robert Jervis explains a key component of deterrence is the ability to recognize the enemy's intentions because

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[32] Lawrence Freedman, *Deterrence*, p. 15

[33] Patrick Morgan, *Deterrence Now*, p. xix

[34] Patrick Morgan, *Deterrence Now*, p. 4

> The central argument that great dangers arise if an aggressor believes that the status quo powers are weak in capability or resolve and that the state must display the ability and willingness to wage war.[35]

Jervis' point and a key factor in any deterrence policy is that certain states respond to the threat of force. Therefore, deterrence can be used to achieve national strategy if it is used against the correct type of enemy. A thorough understanding of intentions puts leaders in better position to determine if a given state is a candidate for deterrence or if some other type of policy, such as engagement, may be more appropriate.

Another security expert, John Ikenberry introduces the concept of "strategic restraint" in an effort to lessen the need for deterrence policies. His concept proposes that states seek to bind their own limits through international institutions.[36] In addition, Janice Stein and Lawrence Freedman in separate writings underscore the logic of deterrence by asserting common deterrence assumptions primarily based on a cost-benefit model.[37] Looking back at these experts' opinions on deterrence reveals that it is a highly complex policy requiring a clear understanding of the opposing state. Furthermore, they all emphasize the fact that deterrence takes place between belligerents with existing threatening capabilities and intentions that usually consist of traditional and/or catastrophic weapon systems.

4. Dissuasion

In retrospect, the policies of assurance, deterrence, and defeat feel familiar to U.S. strategists because they achieved success in the past. Threats exist in the world and will arguably always exist. Therefore, these policies will have a place at the bargaining table when deciding on national security strategies. However, these policy options are often expensive, destabilizing, and deadly. Dissuasion, on the other hand, is an attempt to curb the number of strategic, operational, and tactical threats future policy makers will face, and in turn lessen the overall need for assurance, deterrence, and defeat. The U.S. has

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[35] Robert Jervis, "Deterrence, the Spiral Model, and Intentions of the Adversary," *Perception and Misperception in International Politics.* (Princeton NJ: Princeton University Press, 1976), Ch. 3

[36] G. John Ikenberry, *After Victory: Institutions, Restraint, and the Rebuilding of Order after Major Wars*. (Princeton NJ: Princeton University Press, 2001)

[37] Janice Stein "Deterrence and Reassurance," in Philip E. Tetlock et al., eds., *Behavior, Society, and Nuclear War, vol. II* (New York: Oxford University Press, 1991) and Lawrence Freedman, *Deterrence*

more friends than enemies, but even so, most states do not fall consistently into either of these categories (reference Figure 4). Traditional U.S. defense policies do not seem to afford an effective means for dealing with these types of states. Become too friendly with assurances and an aggressive state can simply act unfettered, but become too hostile with deterrence and then little room is available to back out of a security dilemma. To better addresses the current environment and avoid some of the problems with other defense policies, U.S. leaders coined the notion of dissuasion. Professor Richard Kugler of the National Defense University (NDU) summarizes the rationale for dissuasion.

> It offers a potent concept for handling geopolitical situations in which U.S. relationships with key countries fall short of overt rivalry but can deteriorate if strategic and military competition takes hold.[38]

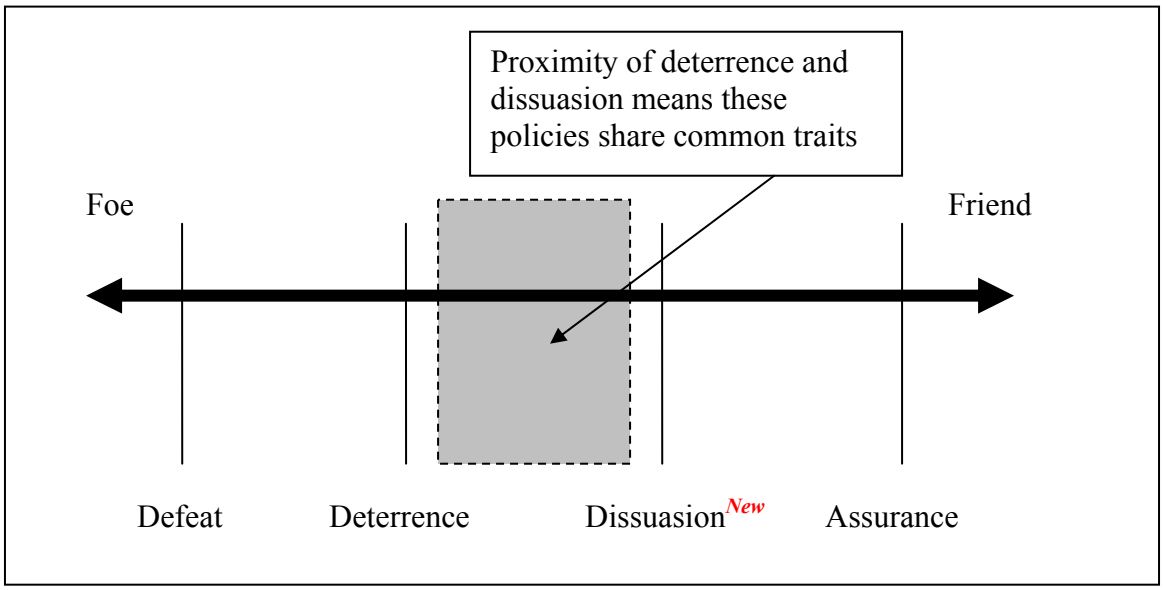

Figure 4. Defense Policy Gray Area (Friend or Foe?)

A review of current U.S. strategic guidance (e.g., 2001 QDR, 2002 NSS, 2004 NMS, and 2005 NDS) provides a very brief and broad overview as to how U.S. policy makers view the implementation and execution of dissuasion. The 2002 NSS states that "our military must dissuade future military competition," the 2001 QDR states that

[38] Richard Kugler, "Dissuasion as a Strategic Concept." *Strategic Forum*, No. 196, Dec 02. Institute for National Strategic Studies, National Defense University, http://www.ndu.edu/inss/strforum/SF196/SF196.pdf (accessed 19 May 05)

dissuasion "influences the nature of military competition, channels threats in certain directions, and complicates military planning for potential adversaries." Furthermore, the 2005 NDS dictates that the U.S. military

> Will work to dissuade potential adversaries from adopting threatening capabilities, methods, and ambitions, particularly by developing our own key military advantages.[39]

However, dissuasion is a relatively new term and its actual use in existing or previous policies is unknown. Some analysts point to ballistic missile defense (BMD), while still others point to the U.S. Navy as forms of dissuasion.[40] In theory, a functional BMD system would drive aggressors away from procuring and producing WMD-tipped ICBMs targeting the U.S. In fact, this is one of the primary reasons that President Reagan pursued the Strategic Defense Initiative (SDI) in 1983. Additionally, not only would SDI render adversary nuclear missiles irrelevant, it would provide the ultimate protection to America's population.[41] Nevertheless, once faced with SDI, aggressors are likely to put the WMD device on a boat, airplane, or develop within America's borders.

U.S. maritime capability represents another possible example of dissuasion and in theory, the American naval fleet is so strong that it has in essence dissuaded other nations from developing comparable fleets. Undoubtedly, the U.S. is the only nation on earth capable of projecting multiple large carrier strike groups in all major waterways. However, one result of this dissuasion has been an increase in the number of states that have mini-subs and anti-ship missiles. In addition, while not necessarily a direct result of the U.S. Navy, the PLA Navy (PLAN) is pursuing a blue water capability, although it would take decades to achieve the quality of U.S. naval operations. Still, these actions seem to go against the desired end state of dissuasion.

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[39] 2005 NDS, p. iv

[40] Pete Lavoy, Barry Zellen, and Chris Clary, "Dissuasion in U.S. Defense Strategy," Dissuasion in U.S. Defense Strategy Conference Report, *Strategic Insights*, Vol III, Issue 10 (Oct 04), Center for Contemporary Conflict (CCC), Naval Postgraduate School (NPS), 22 Sep 04. http://www.ccc.nps.navy.mil/events/recent/dissOct04_rpt.asp (accessed 8 May 05)

[41] Steven Hook and John Spanier, *American Foreign Policy Since World War II*, Sixteenth Edition. (Washington DC: CQ Press, 2004), pp. 193-194

These two cases underscore the likelihood that dissuasion will spur the growth of asymmetric warfare much the same way that U.S. conventional force dominance has spurred a rise in terrorism and insurgency, two means of warfare that the U.S. handles poorly. In either case, no policy maker or strategist has previously stated that U.S. involvement or policies in these defense programs are part of a much broader dissuasive campaign. Dissuasion is still a relatively new policy and its record of accomplishment in strategy employment and policy results are difficult to measure. Examining past cases in which the concept can be observed to have operated, even if the term itself did not exist, may provide insight into possible benefits and consequences of this policy.

While past events can help explain dissuasion's objective, it is future threats that truly comprise this policy's intended target set. According to the 2001 QDR, dissuasion targets "future military competition." Moreover, the 2001 QDR states that to

> Have a dissuasive effect, this combination of technical, experimental, and operational activity has to have a clear strategic focus.[42]

In addition, the 2001 QDR describes dissuasion as having a "channeling" affect due to superior U.S. technological strengths.[43] The downside of a policy that advocates the bolstering of an existing strength is that it drives adversaries to find U.S. weaknesses. It is not feasible to consider dissuasion in relation to every conceivable military threat. While the U.S. economy remains robust, it does have limits, and U.S. leaders must chose judiciously where defense dollars are spent. Designers of U.S. defense policy must provide a "clear strategic focus" by identifying those emerging systems that present the greatest threat to U.S. security.[44] In addition, they need to weigh these future threats against the probability of dissuasion being a successful policy. While dissuasion may cause an adversary to avoid certain types of weapons, U.S. policy makers must address critical questions: "What will the adversary pursue instead" and "Is it possible that the asymmetrical choices they make are worse for the U.S. then if dissuasion had not been

[42] 2001 QDR, p. 11

[43] 2001 QDR, p. 12

[44] 2001 QDR, p. 12

implemented?" The Chinese military space program is an example of an emerging threat, in relation to which a strategy of dissuasion may offer some promise of success.

Dissuasion represents a different approach to achieving strategic objectives in a rivalry-based global environment. According to the 2005 NDS dissuasion targets potential adversaries in an effort to discourage them

> From adopting threatening capabilities, methods, and ambitions, particularly by developing our own key military advantages.[45]

In his book *Astropolitik*, Everett Dolman advocates an elaborate space-based dissuasive strategy where the U.S. dominates satellite orbits so thoroughly with space weapons capable of shooting down adversarial space systems that no aggressor or enemy of the U.S. is capable of fielding a space platform, regardless of its proposed intentions, without America's consent.[46] A key difference between the two policies is that dissuasion tries to pre-empt the production of weapon systems where as deterrence assumes the weapon system already exists or will exist shortly. Moreover, dissuasion applies to U.S. allies who might wish to acquire weapon systems perceived as detrimental to U.S. policies (i.e., regional arms race). In certain situations, older, more traditional defense policies are the appropriate policy solution to achieve national security. However, in other situations, dissuasion may afford the best chance at maintaining U.S. interests as well as gaining a potential ally.

E. U.S. DEFENSE POLICIES AND THE CHINA-TAIWAN ISSUE

Some security experts believe that dissuasion was devised specifically to deal with China, a state that at times acts like an adversary to U.S. interests, but still at other times acts like a friend.[47] Therefore, the current China-Taiwan reunification issue serves as a good test case to demonstrate the application of U.S. defense policies as well as further illustrate the potential of dissuasion. In addition to the definitions provided above

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[45] 2005 NDS, p. iv

[46] Everett Dolman, *Astropolitik: Classic Geopolitics in the Space Age*. (London; Portland, OR: Frank Cass Publishing, 2001), specifically pp. 156-158, although the entire book embodies this strategy

[47] Brad Roberts, "Dissuasion and China," *Strategic Insights*, Vol III, Issue 10 (Oct 04), Center for Contemporary Conflict (CCC), Naval Postgraduate School. http://www.ccc.nps.navy.mil/si/2004/oct/robertsOct04.asp (accessed 29 May 05)

as well as the defense policy targets shown in Figure 3, this section breaks down the application of defense policies across strategic, operational, and tactical levels. One caveat is that this analysis does not exhaust all the possible applications of U.S. defense policies with respect to the China-Taiwan scenario. Instead, it demonstrates one logical albeit simple application of an integrated defense strategy that comprises these policies, with particular emphasis on the less mature concept of dissuasion.

Figure 4 illustrates the strategic level application of the U.S. defense policies towards China and Taiwan. The U.S. actively assures Taiwan of its diplomatic, economic, and military support in the face of aggressive attempts by China to reunify. In addition, the U.S. assures Taiwan that it should avoid making controversial statements and legal action that serves to antagonize the PRC. Moreover, the U.S. dissuades China from pursuing aggressive approaches to reunification through a collage of military, foreign, and trade policies. Simultaneously, the U.S. also maintains a well-armed regional force under the U.S. Pacific Command (PACOM) that serves as a deterrent to hostile PLA actions.

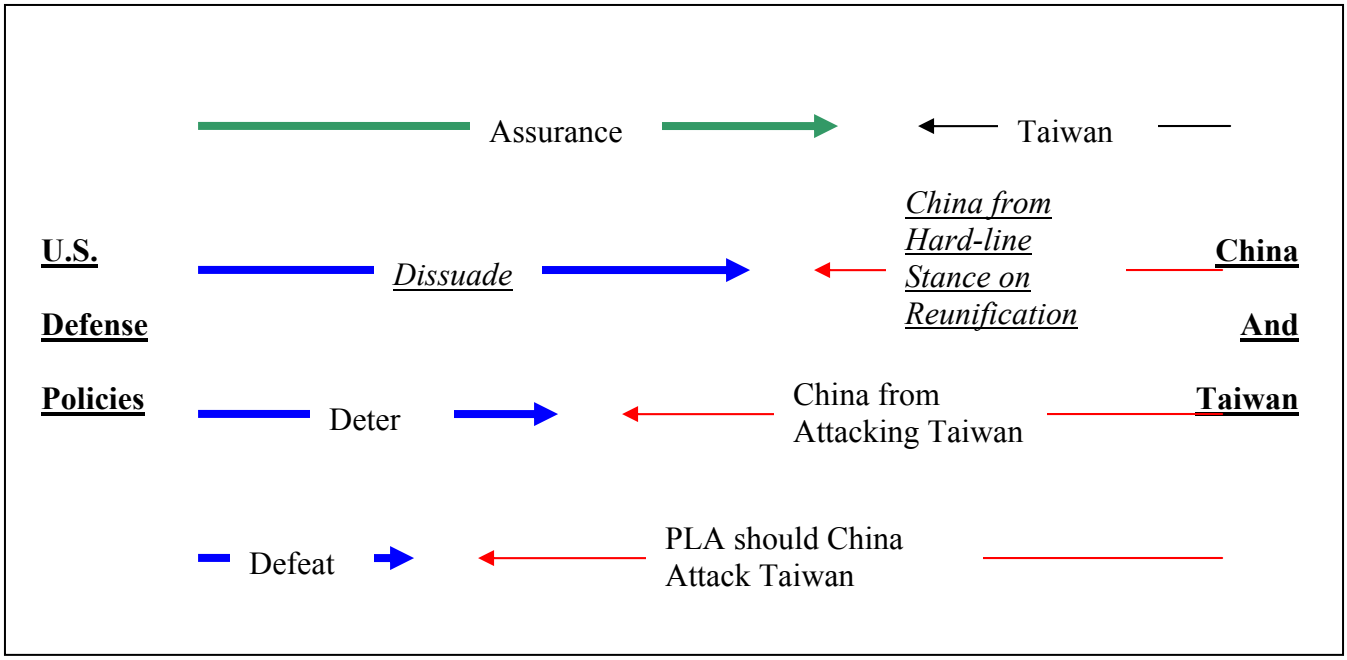

Figure 5. U.S. Defense Policies (at the Strategic Level) with Respect to China-Taiwan Relations

At the operational level, the U.S. takes similar steps to manage this situation as shown in Figure 5. The PACOM, DoD, and State Department establish a variety of personal and professional networks with Taiwanese counterparts to strengthen the U.S. assurance policy. In addition, the DoD takes selective steps to dissuade the PLA from fielding specific weapon systems. As shown in Figure 6, one possible list of dissuasive targets is the space weapons mentioned in the 2005 NDS. Therefore, U.S. leaders can attempt to take steps (e.g., enhance current technology, establish treaty forbidding specific space platforms, etc) to carry out a dissuasive policy. Next, PACOM develops regional war plans and conducts frequent exercises and training missions to demonstrate the lethality of U.S. forces. This serves notice to Beijing and the PLA that Washington and the Pentagon possess the capability to follow through with combat operations if necessary. In other words, PACOM efforts at dissuasion are designed to show capability without being provocative.

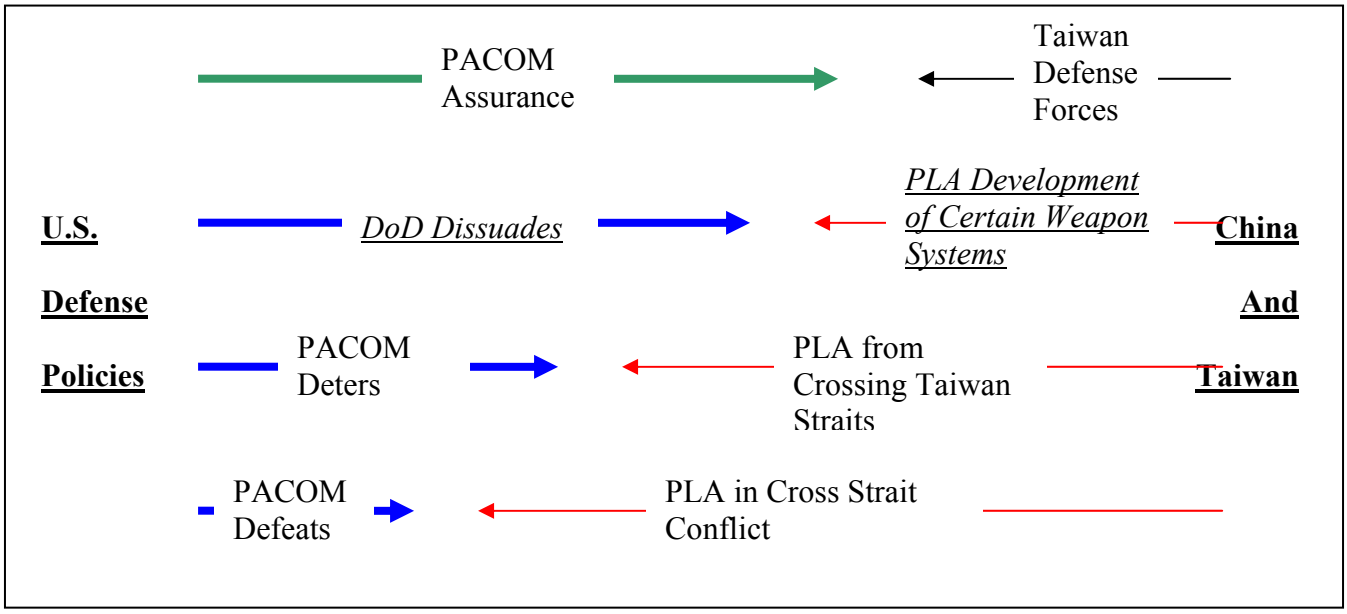

Figure 6. U.S. Defense Policies (at the Operational level) with Respect to China-Taiwan Relations

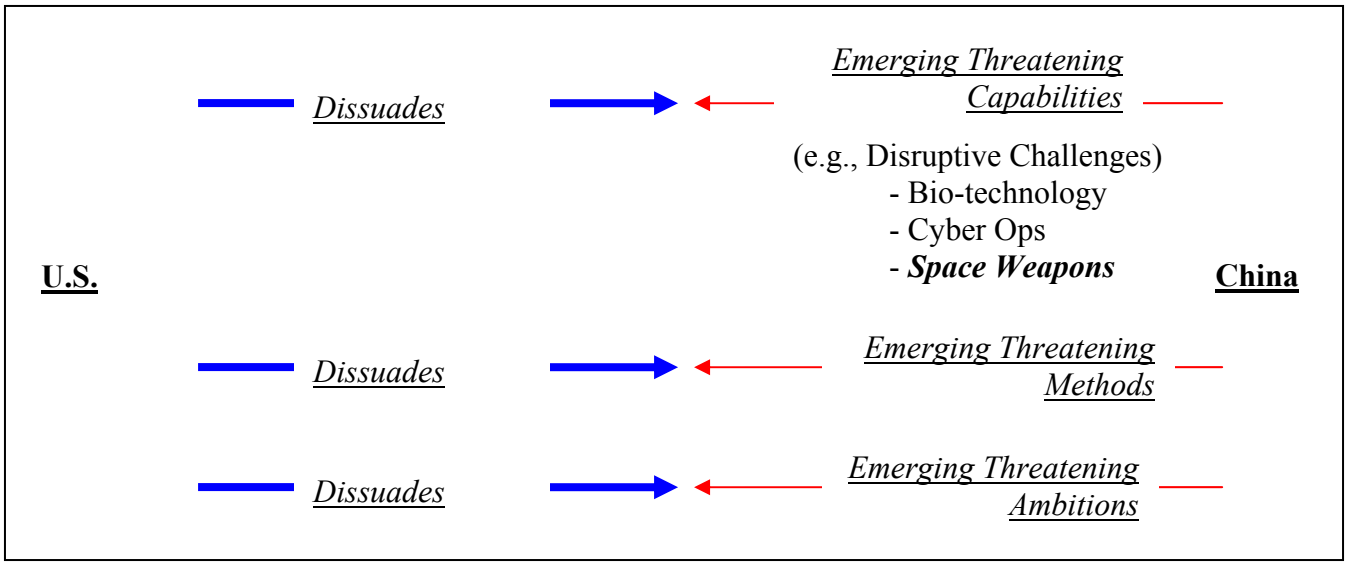

Figure 7. U.S. Dissuasion Policy and its Sub-Components[48]

Since a host of tactical level operations take place for a given scenario, this discussion will use space systems to clarify the tactical level defense strategy depicted in Figure 7. In the U.S. military, normally the Joint Forces Air Component Commander (JFACC) will control U.S. space forces during conflicts since this individual owns the preponderance of space assets and the means to control them. Lacking a conflict, a combination of other U.S. military organizations will control space forces. Nonetheless, the JFACC (as depicted in Figure 7) or some other U.S. leader will assure the Taiwanese of access to space. In addition, the JFACC will attempt to dissuade the PLA from developing counter space systems that could undermine or negate U.S. space superiority. In concert, the JFACC will also provide the necessary offensive and defensive counterspace (OCS/DCS) forces to deter the PLA from using space. Finally, if appropriate, the JFACC will execute his OCS systems and deny the PLA access to space.

[48] 2005 NDS, p. 7

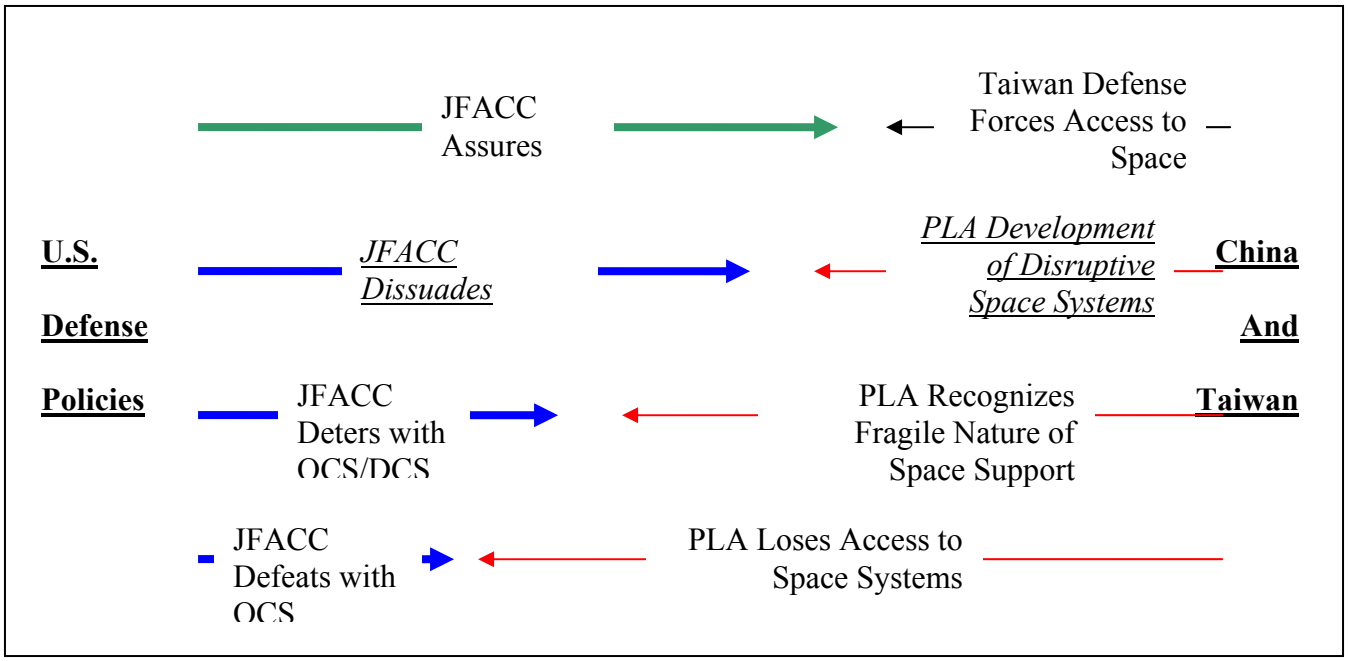

Figure 8. U.S. Defense Policies (at the Tactical level using Space Systems) with Respect to China-Taiwan Relations

F. SUMMARY

Several factors contributed to the creation of dissuasion as a U.S. defense policy. Failed policies of past regimes and the misapplication of these policies each contributed to the realization that something different may be warranted. In addition, there is a general recognition that some states currently lay within a gray area, where it is difficult to discern friend from foe. In these cases, the misapplication of deterrence or assurance might lead to catastrophic results. Therefore, U.S. strategists crafted a new defense policy to better account for these situations and re-enforce the overall integrated U.S. defense strategy with a policy that seeks to reduce the number of emerging threats, whether at the strategic, operational, or tactical levels.

A brief examination of the more mature defense policies (i.e., assurance, deterrence, and defeat) helped to put the new concept of dissuasion into context. Clearly, the characteristics that make up dissuasion represent some of the same ones that factor into deterrence and assurance. Consequently, dissuasion provides a tool that capitalizes on common interests by encouraging would-be adversaries to work with the U.S. in

harmony and not slip towards an aggressive relationship. Unfortunately, current U.S. planning documents do not provide much explanation of how to implement a dissuasive strategy.

This chapter has sought to develop a simple and logical case to demonstrate the possibility of a U.S. defense strategy targeting the China-Taiwan reunification issue. At the strategic, operational, and tactical levels, each defense policy has a clear objective that targets a specific threat. Assurance policies target allies, dissuasion targets emerging threats, deterrence targets existing threats, and defeat targets engaged threats. Digging deeper into dissuasion reveals that it seeks to target threats predicted upon emerging capabilities, methods, or ambitions. Depending on the level of analysis, this could be either a state, a non-state organization, or a potential weapon system. For a possible China-Taiwan conflict, it is likely that the PLA will attempt to employ counter space technologies in an effort to degrade U.S. space superiority. Since space weapon platforms are still an emerging threat, it makes sense to counter them with a dissuasive strategy. The next chapter discusses China's space program and the potential threat it presents to U.S. forces.

III. SPACE OPERATIONS IN A SINO-AMERICAN CONFLICT

A. BACKGROUND

On October 15 2003, China became only the third nation to send a man into space. Astronaut Lieutenant Colonel Lang Liwei's 21-hour orbit made him an instant hero in China and reaffirmed Beijing's commitment to modernize the PLA. Observant during the Cold War, Desert Storm, Allied Force, Enduring Freedom, and Iraqi Freedom, Chinese leaders saw the affect of space support to air, land, and sea operations. They witnessed the value of space enhancement across everything from basic command and control to intelligence gathering to weapon accuracy. In a few instances, they have even begun to capitalize on this recognition. Recent employment of advanced Feng Huo space command and control (C2) systems,[49] new Fanhui Shi Weixing (FSW) space-based intelligence-surveillance-reconnaissance (ISR) capabilities,[50] and most importantly, covert efforts to develop counter space systems and tactics aimed at negating an adversary's space capability loom large on U.S. defense strategists' minds.[51] To create these counter space threats, China is developing, at its restricted space facility located in the Gobi desert,[52] space weapons such as anti-satellite lasers and parasitic micro-satellites.[53] Using lexicon from the current U.S. defense establishment, these types of

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[49] Phillip Clark, "Civil and Commercial Satellite Communications – China," Jane's Space Directory, Jane's Information Group, 8 Dec 04, http://www4.janes.com/subscribe/jsd/doc_view.jsp?K2DocKey=/content1/janesdata/yb/jsd/jsd_0154.htm@current&Prod_Name=JSD&QueryText= (accessed 8 May 05)

[50] White Paper: Full Text of China's Space Activities, 22 Nov 00, FBIS CPP20001122000046

[51] Fiscal Year 2004 Report To Congress On People's Republic of China (PRC) Military Power, Department of Defense (DoD) Publications, Washington DC, 28 May 2004, http://www.defenselink.mil/pubs/d20040528PRC.pdf (accessed 8 May 05)

[52] "China's Secret Cape Canaveral A Sprawling City Of 15,000," Space Daily, 2 Sep 04, http://www.spacedaily.com/news/china-04zze.html (accessed 19 May 05)

[53] David, Leonard, "Pentagon Report: China's Space Warfare Tactics Aimed at U.S. Supremacy," Space News, 1 Aug 03, http://www.space.com/news/china_dod_030801.html (accessed 8 May 05); For more discussion on Chinese ASAT development read Phillip Saunders, Jing-dong Yuan, Stephanie Lieggi, and Angela Deters, "China's Space Capabilities and the Strategic Logic of Anti-Satellite Weapons," Center for Non-Proliferation Studies (CNS), Monterey Institute of International Studies (MIIS), Monterey, CA, 22 Jul 02. http://cns.miis.edu/pubs/week/020722.htm (accessed 29 May 05)

space systems can constitute a "disruptive" technology that represents an "emerging" threat to U.S. space superiority.[54]

> Phillip Saunders recognizes the potential that space can provide Beijing.
>
> Chinese space capabilities will improve in the coming decades, producing significant boosts in PLA military capabilities.[55]

In addition, China may also attempt to disrupt U.S. space superiority.

> For countries that can never win a war with the United States by using the method of tanks and planes, attacking the US space system may be an irresistible and most tempting choice.[56]

The convergence of the threat posed by China's space modernization with the already high but still increasing dependence on space by the Pentagon creates a potentially useful target for dissuasion.[57] The first section of this chapter introduces the reader to space operations, to include the advantages and limitations afforded by this medium, common space system functions, and the primary elements comprising a space system. Then, this chapter explores the complications of defense policies that target space systems. Finally, this chapter will discuss the various counter space means by which China might choose to attack American space systems.

B. AN INTRODUCTION TO SPACE OPERATIONS

"Gain the high ground," an old concept that has served militaries well. Whether it was Civil War commanders using balloons to spot enemy movements or the Cold War

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[54] 2005 NDS, pp. 2-3

[55] Phillip Saunders, "China's Future in Space: Implications for U.S. Security," a*d Astra*, *The Magazine of the National Space Society*. http://www.space.com/adastra/china_implications_0505.html (accessed 30 May 05)

[56] Wang Hucheng, "The U.S. Military's 'Soft Ribs' and Strategic Weaknesses," *Liaowang,* Vol. 27, reprinted in *Xinhua Hong Kong Service,* July 5, 2000, FBIS CPP20000705000081

[57] The following three references provide a snapshot of the growth in U.S. military space dependence: "Operation DESERT STORM: Evaluation of the Air Campaign," Letter Report, GAO/NSIAD-97-134, 12 Jun 97; Mosley, Michael, "Operation IRAQI FREEDOM – By the Numbers," USCENTAF Assessment and Analysis Division, 30 Apr 03; Rayermann, Patrick, "Exploiting Commercial SATCOM: A Better Way," Parameters vol 33, no 4 (Winter 2003-04), 54-66

superpowers using satellites to survey opposing ICBM fields, the high ground affords capabilities not easily replaced by land or sea modes of operation. As the highest ground, space has several advantages over other mediums of operation.

1. Advantages

First, space has persistent global access. This means that borders, terrain, and in some cases weather that limit the access of air, land, and sea-based platforms to desired areas do not normally affect space access. The ease by which satellites can move across territorial borders is especially significant since that is the primary limitation of traditional intelligence gathering platforms. International law specifically describes territorial borders as not extending into space.[58] Consequently, satellites can provide daily and global coverage to almost anywhere on the surface of the earth. Second, space provides capabilities and services with very limited or essentially no forward basing, movement of troops and resources, and force protection. In essence, a satellite launched from the U.S. can repeatedly see the world and transmit its findings without any personnel moving outside of U.S. borders. Third, once placed in orbit, space systems are relatively inexpensive to maintain when compared to other mediums of operation. Granted the costs to launch satellites can reach over $1 billion, but once in orbit a handful of sparsely populated ground stations can keep these systems operating for as long as 10-15 years. When one compares this to what it would cost to continuously sustain enough U-2s capable of imaging the entire globe every day of every year the costs of sustaining space operations is considerably less.

If a Taiwan Straits conflict erupted, these advantages would become vital to American military success. With persistent and immediate global access, American forces would presumably have instantaneous C2, ISR, and missile warning services available to them before the conflict even begins. The fact that the PLA could launch an extremely short notice barrage across the straits drives home the utility of this advantage. Furthermore, the fact that space systems provide services with little or no forward

[58] "Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and other Celestial Bodies," Office of Outer Space Affairs, United Nations, Originally signed in Jan 67 and ratified as recently as Jan 03, http://www.oosa.unvienna.org/SpaceLaw/outerspt.html (accessed 8 May 05). This treaty is commonly referred to as the 1967 Outer Space Treaty.

movement of troops or equipment bodes well in this scenario since few U.S. land bases exist within the Taiwan area of operations (AOR). U.S. naval and air forces only need to turn on their systems to be able to utilize a number of many space services. Lastly, the cost-effectiveness of space systems means that limited defense dollars can be used in other areas. Moreover, many space systems can support multiple operations at the same time. For example, America's Defense Satellite Communications System (DSCS) has satellites in geostationary orbits (GEO) that can serve PACOM and CENTCOM requirements simultaneously.[59]

2. Disadvantages

However, like air, land, and sea operations, space also has inherent limitations. First, the location of space systems is rigid and movement from the original position in space is difficult. The laws of orbital mechanics govern satellites and consequently they influence the location of space systems as well as the space systems loiter time over a given area. For example, satellites in GEO remain relatively fixed over a given point on the earth, and from this location, most satellites can see one third of the earth, or in space vernacular the satellites "foot print" covers about one-third of the earth. This phenomenon is what allows individuals to always point their satellite TV dishes in the same direction. However, outside of very small adjustments to the geostationary position, orbital locations for these satellites do not move. Figure 9 provides a snapshot of the various satellite orbits and the most common systems that populate those orbits.

[59] "Survey of Space Weapons System Employment by the 50th Space Wing in Support of operation Iraqi Freedom," 50th OSS/OSK, Schreiver AFB CO, 8 Oct 03, Section 5

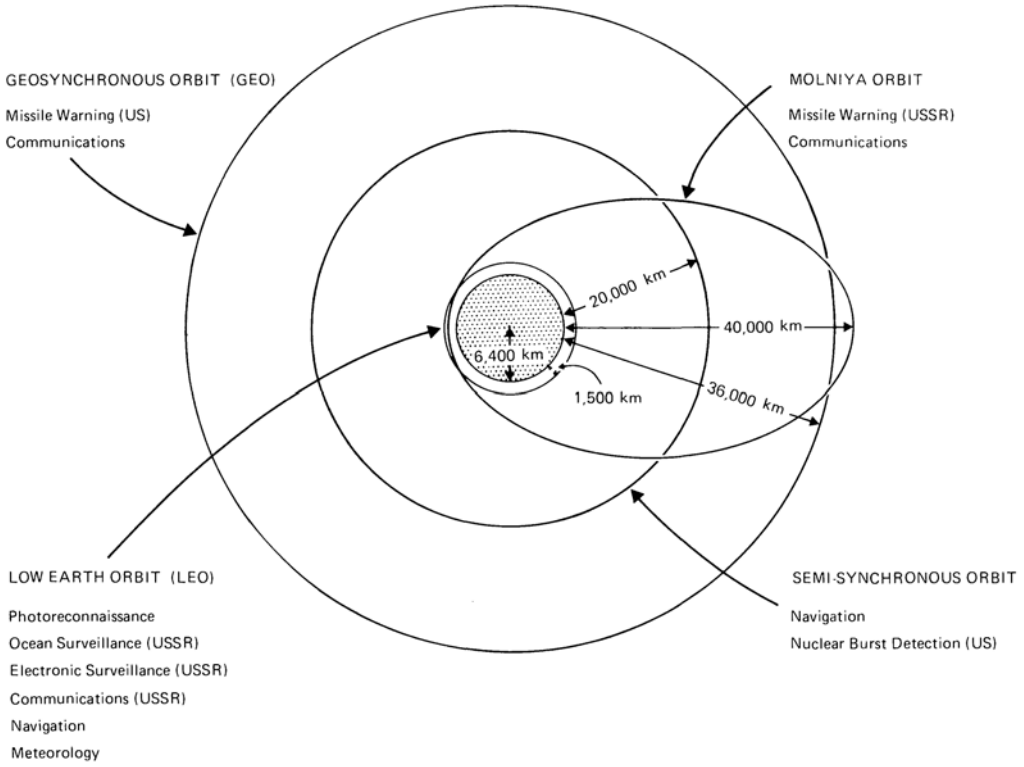

Figure 9. Satellite Orbits and Common Functions[60]

Imagine if the media corporation DirectTV moved a satellite that was providing coverage to the central U.S. further east along the geosynchronous belt to provide more coverage of the eastern seaboard. The results may benefit those on the East coast, but at the same time, this movement probably means that fewer subscribers on the West coast can continue to receive the satellite signal. The consequences are the same for dedicated military systems. If a commander in one theater, say EUCOM needs more satellite communications (SATCOM) bandwidth, the movement of one DSCS satellite may satisfy his needs, but it will likely have a reciprocal affect that reduces the bandwidth in a neighboring theater, like CENTCOM. Granted these kinds of tradeoffs appear in all military conflicts, but it is still helpful for strategists to understand the cost of such decisions.

[60] Ashton Carter, "Satellites and Anti-satellites: The Limits of the Possible," *International Security* Vol. 10, No. 4 (Spring 1986), p. 49

Another factor affecting the feasibility of moving satellites is the extremely limited on-board fuel storage. The introduction of the more efficient Hall-effect thrusters (HET) will help to mitigate this problem, but not on a sufficiently large scale to change the management principles of on-orbit space systems.[61] Movement usually involves a tradeoff between meeting the demands of a crisis that lays outside the intended purpose of the space system and the overall life expectancy of the space system within its original design (since life expectancy directly relates to the amount of on-board fuel available for orbital station keeping).

Similarly, designated orbital paths for satellites in low earth orbits (LEO) do not radically change. Moreover, even though LEO orbits do not remain fixed over a given point but instead circle the earth approximately every 90 minutes, the feasibility of altering the original orbits is constrained.[62] In addition to the fuel concerns that limit the movement of GEO satellites, another reason for lack of flexibility is that any movement of the satellite reduces the original coverage. It is a give-and-take relationship and at times, it may be advantageous to move a satellite, but that is the exception and not the norm.

Second, space systems are not as durable as other air, land, or sea platforms. U-2 aircraft took their first images 50 years ago and many of these same aircraft are still flying missions today. By contrast, space systems usually only last for 10 to 15 years. It is true that some satellites have been known to exceed their specified life expectancy, but not by 40 years. In addition, the ability to repair space systems is negligible. Ground station operators can resolve some anomalies, but essentially nothing can be done when problems require physical contact with the satellite. Other air, land, and sea platforms have maintainers readily available to fix problems, or worst case the systems transition to a depot for extensive repairs. Conversely, it is cost prohibitive to physically repair

[61] Barry Watts, "The Military Use of Space: A Diagnostic Assessment," Center for Strategic and Budgetary Assessments (CSBA), Feb 01, p. 6. Copies can be obtained through http://www.csbaonline.org/ (accessed on 8 May 05).

[62] JP 3-14 Space Operations, p. F-4

satellites, whether through use of the space shuttle or some type of retrieval and re-launch process, space systems are not easily repaired. Yet, even in light of these limitations, space systems still provide a wealth of functionality to numerous types of users.

Many of these limitations will ultimately affect the manner in which the Pentagon executes a conflict with the PRC. First, the space systems of operational value at the start of a conflict are most likely going to be the ones servicing American forces at the end of the conflict. While other space systems may potentially offer additional services, the cost and time required to move them into a useful orbit is too high. Second, the fragility of space systems, and the very limited number of spares means that the functions these systems provide can be quickly and in some cases easily cut off.

3. Space Functions

Space provides a number of useful functions to a variety of users. In addition, it is not uncommon for a single space system such as satellite communication (SATCOM) systems to support multiple users. SATCOM can be used by civilians to make phone calls, surf the internet, or watch television, or it can be used by the military to do those same things plus track logistical movements, issue orders up and down the chain of command, send electronic documents between units, or conduct a video teleconference (VTC) between combatant commander staffs. Take for example the International Telecommunications Satellite Organization (IntelSat), an internationally owned consortium that leases SATCOM services across the globe to individuals, organizations, and states.[63] The U.S. military uses IntelSat to broadcast its Armed Forces Radio and TV Services network, but IntelSat can chose to lease services simultaneously to China, Iran, and Russia for use by their respective militaries (reference Figure 10). Therefore, several space functions are considered dual use. However, SATCOM is only one of many functions provided by space.

[63] 2004 Space Almanac, *Air Force Magazine*, Aug 04, p. 45, http://www.afa.org/magazine/Aug2004/0804space_alm.pdf (accessed 8 May 05)

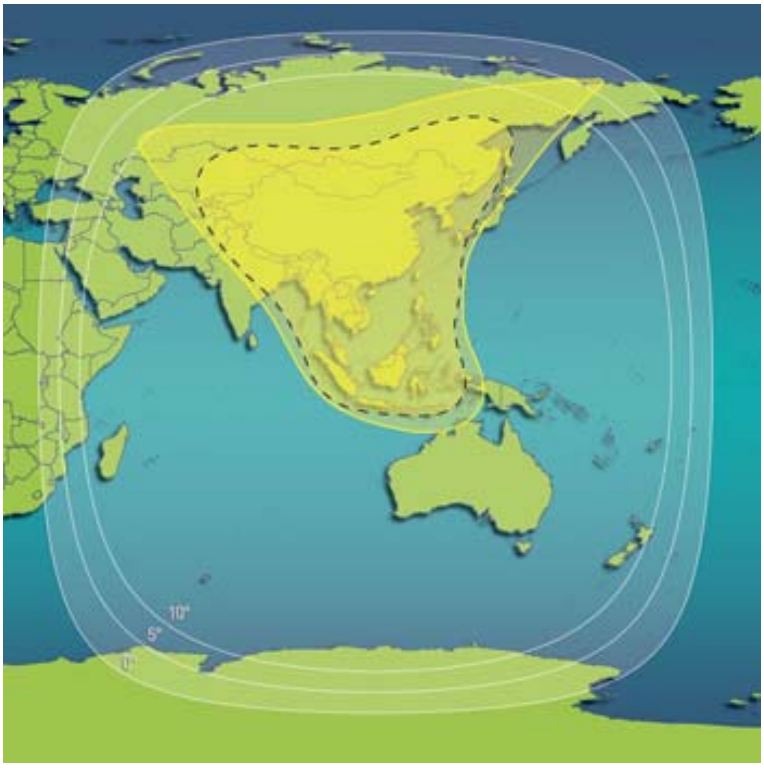

Figure 10. IntelSat Asia Coverage[64]

A commonly accepted grouping of space system functions (reference Table 2) is communications (SATCOM), navigation, remote sensing (i.e., imagery), weather, scientific, missile warning, and reconnaissance. However, the specificity, sensitivity, and economic pay back of space-based reconnaissance-surveillance and missile warning mean that only the military community fields these systems.

[64] The three outer rings in this figure represent the field of view available from the satellite given three different masking angles (0, 5, and 10 degrees). The oblong shaded areas represent the actual SATCOM coverage provided by this specific satellite. Coverage Map for IntelSat satellite APR-2@110.5 degrees East, IntelSat, 2005, http://www.intelsat.com/resources/coveragemaps.aspx (accessed on 8 May 05)

Table 2. Space Functions

	Non-Military	Military
Communication	X	X
Navigation	X	X
Remote Sensing	X	X
Weather	X	X
Scientific	X	X
Missile Warning		X
Reconnaissance and Surveillance		X

There are some additional functions required for the employment of space systems, but they do not necessarily interact with space systems on a daily basis, nor are they required for day-to-day operations. Nonetheless, space launch and space surveillance[65] are two functions critical to the employment of space systems.[66] Without these two capabilities, it would be impossible for space systems to exist. Space launch is analogous to when a new ship gets underway for the first time. Until the ship actually departs from the dock, it is not carrying out its mission. Similarly, satellites cannot provide services while stuck on the ground. In addition, space launch cannot take place until space surveillance uncovers the optimal trajectory to reach the designated orbit. Lack of space surveillance would be the same as aircraft flying around without air traffic controllers de-conflicting flight paths. With nearly 10,000 "softball size or bigger"[67] objects orbiting the globe, and when very small particles can cause substantial damage (e.g., in 1983 a paint flake less than 1/100th of an inch in diameter put a crater in the shuttle Challenger's windshield)[68], it is vital to mission success that the paths satellites traverse remain clear of debris.

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[65] This space surveillance refers to the ground-based systems that track space objects (i.e., Earth systems tracking objects in space), which is different from the space-based surveillance systems in Table 2 that track objects below the earth's atmosphere (i.e., space systems tracking objects on or near earth).

[66] Michael Muolo, *Space Handbook: A Warfighter's Guide to Space, Vol I*, AU-18, (Maxwell AFB, AL: Air University Press, Dec 93), pp. 22, 33, 39, 78, 85, 97-102, all of Ch. 4, and 142

[67] Barry Watts, "The Military Use of Space: A Diagnostic Assessment," p. 78

[68] Jerry Sellers, *Understanding Space: An Introduction to Astronautics*, Second Edition (New York: McGraw-Hill, 2000), p. 70

4. Space System Elements

Space launch and space surveillance underscore the fact that space is much more than just satellites. Most people can point to a tank, bomber, or submarine and understand the basic components of these older military systems as well as appreciate the traditional function these weapons fulfill. Yet, in a number of ways space systems are different from other military platforms. They are relatively unknown and indistinguishable when compared to more familiar weapon systems. These differences and the unfamiliarity of space systems can cause problems when trying to develop a strategy that seeks to prevent a space arms race. Therefore, understanding the elements of a space system can help U.S. leaders craft a more effective defense policy. The U.S. DoD Joint Publications 3-14 Space Operations states that

> Space capabilities are based on complex systems that include the following: ground stations; launch facilities; satellite production, checkout, and storage facilities; communications links; user terminals; and spacecraft (both manned and unmanned).[69]

The definition reveals that space systems consist of more than just satellites (i.e., space nodes), but also include the associated ground stations (i.e., terrestrial nodes) and communication signals (i.e., links) transiting between space and earth (reference Figure 11).

[69] JP 3-14 Space Operations, p. I-1

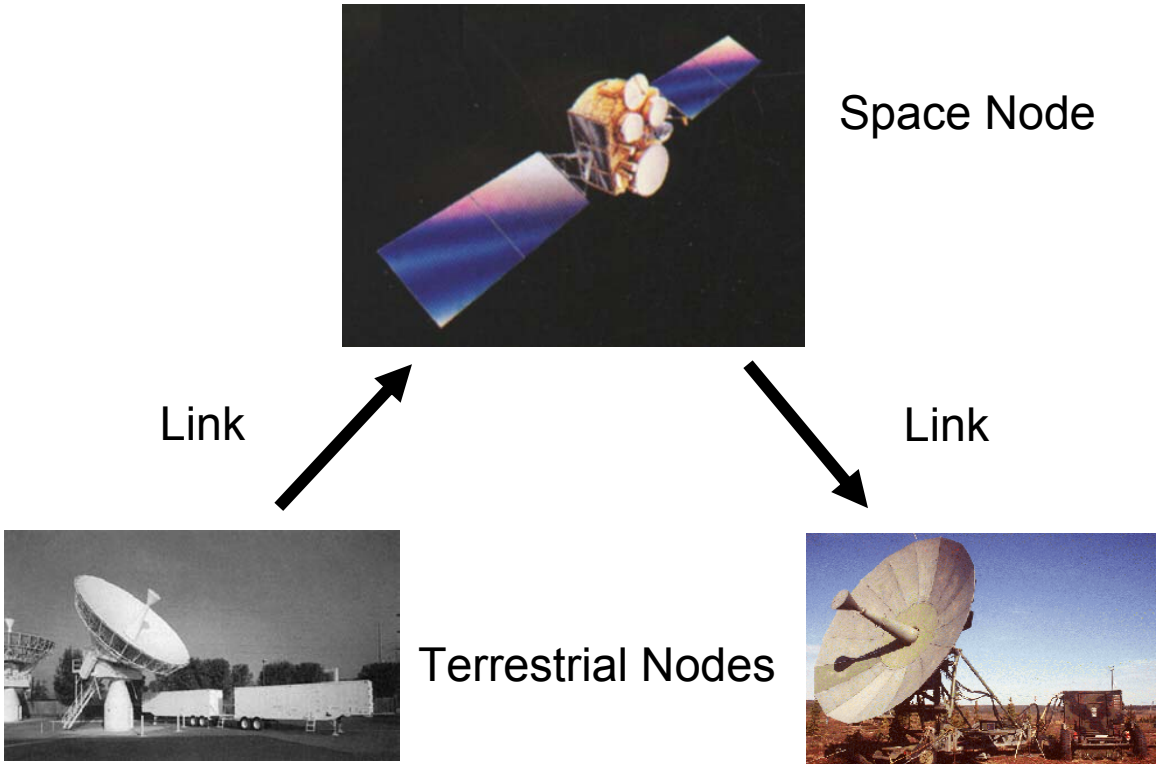

Figure 11. Space System Elements

Understanding the elements of space systems is important because most threats to space systems are capable of targeting only one element. Based on current technology, traditional weapons such as Tomahawk cruise missiles and precision guided munitions (PGM) released from aircraft represent the most likely choice to strike terrestrial nodes. This type of attack, also known as an offensive counter space (OCS) mission,[70] took place during Operation Iraqi Freedom (OIF) when coalition forces PGM pounded the Iraqi Ministry of Information in an effort to take down Iraq's satellite broadcast capability. Saddam's use of GPS jammers against coalition forces in an attempt to degrade the PGM accuracy of coalition forces represents another type of OCS system,

[70] Air Force Doctrine Document (AFDD) 2-2.1 Counterspace Operations, Air Force Doctrine Center (AFDC), Maxwell AFB, AL, 2 Aug 04, p. 3, http://www.dtic.mil/doctrine/jel/service_pubs/afdd2_2_1.pdf (accessed on 8 May 05)

albeit one that targets the space links element.[71] Cuba's July 2003 satellite jamming of the Voice of America broadcast to Iran is another type of ground-based system that targets the satellite links.[72] Aside from the efforts of the U.S. and USSR during the Cold War, few states pursued counter space systems that targeted the space nodes. However, in the wake of American military dominance, due in large part to enhanced lethality of other weapon systems arising from space operations, adversaries may undertake new efforts to develop counter space devices that due in fact target space nodes. The recently released 2005 National Defense Strategy (NDS) considers this family of counter space systems to be an emerging threat to U.S. space superiority.[73] Furthermore, potential foes like China are frantically pursuing space systems that support conventional military operations across the entire spectrum of known space functionality as depicted in Table 2.

With an understanding of the functionality provided by space systems as well as the elements necessary to manage these services, it is easier to identify those areas more susceptible to enemy action and in turn, help U.S. decision makers target weapon systems for a dissuasive campaign. In addition, some functions may prove more useful than others in specific operations. For example, U.S. forces operating in Afghanistan are highly dependent on SATCOM to execute C2 and carry out assigned missions. However, missile warning functions are not required against the remaining Taliban and Al Qaeda networks. In the Taiwan Straits AOR, many space functions, and most certainly missile warning, will prove equally critical to the success of U.S. operations. In addition, the ongoing modernization efforts by the PLA mean that they too are becoming dependent on key space functions, albeit on a much lower scale than U.S. dependency.

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[71] Sagdeev, Roald, "Space Weapons and Space Navigation," U.S. Space Operations in the International Context, Dwight D. Eisenhower National Security Series, The Eisenhower Institute, 24 Feb 04, http://www.eisenhowerseries.com/pdfs/final_04/US%20Space%20Operations%20-%20EI-%20ENSS%20Final.pdf (accessed 8 May 05)

[72] "U.S. Accuses Cuba of Jamming Broadcasts to Iran," Public Broadcasting Service (PBS), PBS On-Line News Hour, 17 Jul 03, http://www.pbs.org/newshour/media/media_watch/july-dec03/jamming_07-17.html (accessed on 8 May 05) and Stephan Johnson, "Cuban Jamming Demands a Firm Response," The Heritage Foundation Web Memo #319, 22 Jul 03, http://www.heritage.org/Research/LatinAmerica/wm319.cfm (accessed 6 Jun 05)

[73] 2005 NDS

C. COMPLICATIONS OF DISSUADING SPACE SYSTEMS

Several factors will complicate a U.S. defense policy of dissuasion that aims to reduce the threat of space systems. First, China's space program already has operational systems providing a wide range of military and commercial capabilities.[74] China's space capabilities give it more than just a foot-in-the-door. In fact, China is already reaping the numerous benefits afforded by the highest frontier. In addition, even though China's space programs are relatively immature when compared to the U.S., the learning curve for improving upon these technologies is steep. Finally, it is one thing to dissuade someone from doing something they cannot already do and hence cannot appreciate its advantages; it is an entirely different thing to dissuade someone from doing something they already do, especially when it has clear benefits.

Second, there is an extremely close relationship between military and commercial entities in the space industry. Some systems are dual use such as navigational or weather satellites. Therefore, targeting programs that provide many services enjoyed by the public is challenging to carry out. For example, it would be difficult to justify the denial of satellite produced weather information used to aid civilian populations. A properly networked space-based weather information structure may have reduced the devastation caused by the recent Indian Ocean tsunamis as well as other types of catastrophic events.

Third, states frequently buy space capabilities from other states or commercial businesses. For example, France and Russia both operate military space systems and it is widely believed that both of these states offer their military space systems for use by other countries.[75] In addition, several commercial companies sell space services to include imaging and satellite communications.[76] This limits the prospect of a dissuasion

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[74] Fiscal Year 2004 Report to Congress on the Military Power of the PRC

[75] Country Capabilities, Current and Future Space Security, Center for Nonproliferation Studies (CNS), Monterey Institute of International Studies (MIIS), Monterey CA, 28 Sep 04, http://cns.miis.edu/research/space/spfrnat.htm (accessed 8 May 05), and Air Force Doctrine Document (AFDD) 2-2 Space Operations, Air Force Doctrine Center, Maxwell AFB, AL, 27 Nov 01, pp. 33-34. http://www.dtic.mil/doctrine/jel/service_pubs/afdd2_2.pdf (accessed on 29 May 05)

[76] Space Imaging, 2005, http://www.spaceimaging.com/ (accessed 8 May 05), and AFDD 2-2, pp. 33-34

policy because even if China abandons certain space programs, they may still acquire similar information through these third party connections.

In light of these reasons, it seems unlikely that dissuasion will succeed in stopping China from pursuing many types of military space systems. In addition, many of these space systems (e.g., commercial communications satellites) simply do not pose a significant enough threat to U.S. security interests to justify a dissuasion campaign. However, space weapon systems that can destroy other satellites (e.g., space mines) or from space can destroy things on earth (e.g., space-based laser) do in fact present a significant threat to not only U.S. space supremacy, but to U.S. security as well. It is for these reasons that a dissuasion campaign should only target counter space systems.

D. COUNTER SPACE SYSTEMS

Counter space systems can be broken down into two categories: offensive counter space (OCS) and defensive counter space (DCS).

> OCS operations preclude an adversary from exploiting space to their advantage. OCS operations may target an adversary's space capability (space systems, terrestrial systems, links, or third party space capability), using a variety of permanent and/or reversible means. The "Five Ds" — deception, disruption, denial, degradation, and destruction—describe the range of desired effects when targeting an adversary's space systems.[77]

The 1997 Iranian jamming of Western satellite broadcasts and the 1999 Russian disruption of Chechen satellite phone calls and are two examples of OCS activities.[78] Conversely, DCS tactics and devices protect space systems from hostile or damaging activities.

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[77] AFDD 2.2-1 Counterspace Operations, p. 3

[78] "Ministry Spokesman Admits Phone Jamming in N. Caucasus," Paris AFP (North European Service), 24 Nov 99, FBIS AU2411101599; "Mullah's Terrorism Targets Satellite Communication," National Council of Resistance of Iran – Paris, 12 Aug 97, http://www.iran-e-azad.org/english/ncr/970812.html (accessed 8 May 05)

> DCS operations preserve US/friendly ability to exploit space to its advantage via active and passive actions to protect friendly space-related capabilities from enemy attack or interference. Friendly space-related capabilities include space systems such as satellites, terrestrial systems such as ground stations, and communication links. DCS operations are key to enabling continued exploitation of space by the US and its allies by protecting, preserving, recovering, and reconstituting friendly space-related capabilities before, during, and after an adversary attack.[79]

In certain instances, a single action can take on OCS and DCS characteristics simultaneously. For example, a well placed Tomahawk missile on a SATCOM jammer located in Cuba is both an OCS and DCS mission. From an OCS perspective, the attack destroys an adversary's space system. However, from a DCS perspective the attack protects U.S. space operations from the hostile actions of the jammer.

Similar to a fighter aircraft's ability to dispense chaff and flares and produce threat reaction maneuvers in response to surface to air missiles (SAM), space systems must also be able to defend against hostile acts. DCS consists of various measures aimed at defeating an adversary's attack. These measures consist of such tactics as system hardening, dispersal, maneuvering, system configuration changes, and suppression of adversary counterspace capabilities (SACC).[80] Unfortunately, these current measures provide no realistic defense against anti satellite lasers, parasitic micro satellites, and advanced computer network attacks. While some satellites, like an imaging system, may be able to automatically place a protective cap over the system's lenses, it cannot stop an anti-satellite weapon from physically destroying the entire satellite bus. In addition, while satellite movement is theoretically feasible, this movement in relation to the potential threats is too slow to prevent an attack.[81] Therefore, the U.S. is attempting to take meaningful steps to improve DCS capabilities.

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[79] "Ministry Spokesman Admits Phone Jamming in N. Caucasus," Paris AFP (North European Service), 24 Nov 99, FBIS AU2411101599; "Mullah's Terrorism Targets Satellite Communication," National Council of Resistance of Iran – Paris, 12 Aug 97, http://www.iran-e-azad.org/english/ncr/970812.html (accessed 8 May 05)

[80] AFDD 2-2.1 Counterspace Operations, pp. 26-27

[81] Singer, Jeremy, "STRATCOM Chief says need for Space Control is Now," Space News, 30 Mar 04, http://www.space.com/news/nss_stratcom_040330.html (accessed 8 May 05)

Improving DCS system capability may allow for the shielding of critical components from potentially destructive forces. For example, the newest GPS Block III satellites in production house more robust DCS capabilities than previous versions. These capabilities enable the satellite to withstand multiple levels of denial, disruption, and degradation attacks.[82] The Air Force's Military Strategic and Tactical Relay (MILSTAR) satellite constellation represents another example of improved DCS capabilities. This system is designed to reduce the impacts of nuclear explosions on SATCOM signals as well as on the satellite itself. Moreover, MILSTAR utilizes cross-links between satellites thereby reducing, although not eliminating, the requirement for terrestrial ground station support.[83] However, since U.S. territory is no longer considered unassailable ground station physical security is also being strengthened through improved force protection measures. Moreover, new space systems will have abilities to threat react in a more tactical nature. Again, similar to air operations where pilots use on-board sensors such as radar warning receivers (RWR) gear to make real time defensive maneuvering decisions, so too will space operators for the systems they command. Nonetheless, while the U.S. has taken some steps to upgrade its DCS capability, space systems remain highly vulnerable to attack.

In addition to OCS and DCS categories, counter space systems can also be separated into space-based and ground-based. Space-based OCS systems include mines, lasers, and any other types of space-based platforms designed to deny, degrade, disrupt, deceive, or destroy. Interestingly, no state employs or has ever employed space-based OCS systems. The Strategic Defense Initiative (SDI) put forth by President Regan in 1983 had the capacity to disrupt other space systems, although that was not the primary mission of this program. Furthermore, this system never progressed beyond the initial stages of research. Conversely, the Soviets and Americans did develop and test ground-

[82] NAVSTAR GPS Block III Specs, Andrews Technical Service, 14 Apr 03, http://www.spaceandtech.com/spacedata/constellations/navstar-gps-block3_conspecs.shtml (accessed 8 May 05)

[83] Boeing Satellite Systems Fact Sheets, MILSTAR II, 2004, http://www.boeing.com/defense-space/space/bss/factsheets/government/milstar_ii/milstar_ii.html (accessed 8 May 05)

based OCS systems. Specifically, each country explored the utility of an anti-satellite (ASAT) missile.

The Soviets first ASAT used an ICBM fitted with an explosive device that released 1,000s of small pellets once it approached its intended satellite target. In addition, the Soviet nuclear-armed *Galosh* ABM interceptor could fulfill the role of ASAT weapon against satellites in specific low earth orbits (LEO). The Americans also investigated a crude ASAT system in the late 1960s but eventually abandoned it in favor of an F-15 launched ASAT system that lingered in existence until the mid-1980s.[84] During this time, the development of ASAT systems may have seemed like simply a natural evolution of space operations. Much like other mediums of operation, it was only a matter of time before the necessity arose to destroy and therefore protect space-based systems. Interestingly though, space systems did not follow this path and ASAT technology never did produce a true military arms race in space. In fact, to this day space has remained relatively free of weapons.

One reason why ASAT development did not endear itself to superpower leadership was the potential destabilizing affect it would cause on the tenuous nuclear arms race. ASAT systems that destroyed the adversary's missile warning or communications systems may mean that the aggressor is considering a first strike. ASAT systems that target remote sensing platforms may imply that one side is either trying to covertly change its nuclear order of battle, by moving systems around or fueling up new systems. In either case, ASAT systems constituted a precursor to a first strike, which might cause a destabilizing influence on the already tricky Cold War. Therefore, the presence and affect of ASAT systems during the Cold War was short lived and of small impact. In addition, the demise of the ASAT re-enforced the notion that space systems best served a critical but nonetheless supporting role to other means of warfare and security. President Johnson highlighted the capability and value of the supporting role played by these early space programs.

84 Joseph Nye and James Schear, *Seeking Stability in Space: Anti-Satellite Weapons and the Evolving Space Regime*. (Lanham, Maryland: University Press, Inc., 1987), pp. 7-8

> I wouldn't want to be quoted on this but we've spent 35 or 40 billion dollars on the space program. And if nothing else had come out of it except the knowledge we've gained from space photography, it would be worth 10 times what the whole program cost. Because tonight we know how many missiles the enemy has and, it turned out, our guesses were way off. We were doing things we didn't need to do. We were building things we didn't need to build. We were harboring fears we didn't need to harbor. Because of satellites, I know how many missiles the enemy has.[85]

Johnson's comments re-enforce the notion that the U.S. is highly dependent upon space capabilities. Therefore, it makes sense that current as well as potential adversaries would seek to develop other, more acceptable counter space technologies. The GPS jammers used by Saddam's forces during Iraqi Freedom and the SATCOM jammer used by Cuba to negate the Voice of America broadcast (i.e., both are OCS systems that target the links element of space systems) represent a lucrative area for growth in counter space systems. First, they are cheap and relatively easy to build. Second, they have proven capabilities, especially the SATCOM jammer used against Voice of America. Third, they avoid the current dilemma of weaponizing space, although it certainly offers a slippery slope in that direction. Fourth, while it is possible that these systems could target missile-warning systems, they are unlikely to foster the levels of instability created by the Cold War ASAT systems. Finally, they offer the potential of disrupting a key area of U.S. military dominance and subsequently reducing the overall combat effectiveness of American forces.

Another potential counter space system that offers equally appealing affects is lasers that could target space nodes, links, and possibly even terrestrial nodes. However, several differences exist between lasers and jammers. One difference is that jammers are a more proven commodity and in some cases have worked remarkably well in actual employment. In addition, various forms of electronic jamming have been taking place for decades. For example, the U.S. military used a variety of airborne jammers during the initial stages of Desert Storm to help confuse the enemy. Conversely, laser

[85] Dwayne Day, John Logsdon, Brian Latell, *Eye in the Sky: The Story of the CORONA Spy Satellites*. (Washington DC: Smithsonian Institute Press, 1998), p. 1

technology as a space weapon is still confined to research and development, and seems to be a longs way from actual operational status, not to mention doctrinally proven and integrated into other operations. For many of these same reasons, space mines are unlikely to reach operational status in the near future. In sum, with respect to space-based counter space systems, many problems exist.

Since there is considerable momentum to keep space free of weapons that the most likely course available to China to attack U.S. space superiority is through ground-based counter space technologies. These systems offer sufficient capability to successfully target and engage U.S. space platforms.

Table 3. Offensive Counter Space (OCS) Systems

	Research and Development	**Tested**	**Operational**
Ground-Based			
Jammers			X
ASAT		X	
Laser	X		
Space-Based			
Micro-Satellites	X		
Mines	X		
Laser	X		

E. SUMMARY

Deng Xiaoping's harsh criticism of the PLA in 1979 sparked numerous efforts by the PRC to modernize its military to meet the demands of national security. In the decades that have followed, new Chinese leadership pressed for continued steps to update a severely archaic military, especially in light of the amazing successes of U.S. forces during this time. Today, PLA modernization efforts continue with modest results in various areas to include space operations. As one of three states to send a man into space

and one of seven states capable of launching satellites, China is making progress to harness the power of this new medium.

And why not? Space provides a wealth of capabilities across a number of important functions, which would prove beneficial to both the Beijing and Washington in a Taiwan Straits conflict. However, the multiple elements necessary to operate space systems make them more vulnerable than other, more traditional weapon systems. Of immediate concern is the fact that the links element of space systems is particularly susceptible to jamming. Therefore, while space operations are critical, they are also vulnerable, and while U.S. forces are highly dependent upon these systems, they are not well protected nor easily replaced. Nonetheless, space systems are a key component to any plan the U.S. as well as PRC might execute in the Taiwan Straits.

However, numerous factors constrain the applicability of a dissuasion policy that seeks to reduce the emergence of Chinese space capabilities. Many space systems are dual use in nature and therefore difficult to target with this policy. Furthermore, some space systems simply do not pose a threat to U.S. space superiority or the type of information provided by them can be obtained through another state or via commercial industries. Consequently, the area most likely to offer a useful target for dissuasion is counter space systems.

Counter space systems, primarily OCS, are still an emerging threat that do not support civilian needs or currently exist in an established role in PLA operations. Therefore, these types of space systems provide U.S. policy makers with an ideal target for a dissuasive strategy.

In all conflicts, opposing sides strive to find a weak spot to exploit. One weak spot in the U.S. military arsenal is space systems. These platforms provide a host of capabilities not easily replaced. Compounding this problem is the fact that most of these systems have essentially no defensive mechanisms to fend off possible attacks. Furthermore, the communication links, the means by which space systems receive and deliver information, has proven to be especially easy prey using relatively primitive techniques, as recently demonstrated by Russia, Iran, and Cuba. Ground-based space

jammers represent one of several possible counter space systems likely to be developed by the PLA and ultimately employed against the U.S. military in a future conflict. It behooves U.S. strategists to ponder the dynamics of space operations and the manner by which U.S. forces as well as Chinese forces utilize these systems. The proper analysis of the PLA and its use of counter space systems will enable American leaders to ascertain if a dissuasion strategy can effectively reduce the threat presented by these emerging systems.

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IV. CONDITIONS FOR SUCCESS

A. BACKGROUND

All other things being equal, it is usually safe to assume that decision makers look at situations and make decisions based on a cost-benefit analysis. "Will this decision and the resultant course of action it sets us on as well as the counter actions taken by others garner me more than it costs?" However, in some cases, the decisions are less about achieving success than about avoiding failure. In other words, some instances require decision makers to accept a limited amount of loss to avoid even greater losses in the future. For example, it may be costly to leave U.S. space systems defenseless, especially given the enhancements space endows upon the greater American military machine. However, the costs may be even higher if U.S. leaders choose to truly weaponize space since other states would be compelled to produce comparable space weapons to keep pace with Washington's military build up. Nonetheless, the conditions for success usually exist when the benefits of a specific course of action outweigh the costs. This chapter focuses on establishing the conditions necessary for a policy of dissuasion that targets Chinese OCS systems to succeed.

Defining the conditions for successful dissuasion is challenging because no historical record exists that describes its application and subsequent consequences. Nonetheless, the 1983 proposal for the Strategic Defense Initiative (SDI) may offer a snapshot into the types of conditions necessary for dissuasion. The theoretical utility of SDI was formidable and if proven capable of actual operations it may have seriously jolted the nuclear stability of this time. In addition, the nature of this system would profoundly affect the manner by which the U.S. could execute future conventional missions. With assured access to space for the U.S. and its allies combined with assured denial of space to the USSR and its allies, the potential capabilities and political ramifications of this system were powerful. Therefore, SDI represented to its proponents a system that would diminish a key foundation of the USSR *military* forces, the ICBM.

Furthermore, the *economic* costs for the USSR to match SDI were simply insurmountable, although the costs to defeat the system were likely to be much less.

Already in a tailspin from the apparent economic boom of the late 1960s and early 1970s, the USSR could not afford to precede step-for-step with the U.S. SDI efforts. Moreover, the *diplomatic* conditions present during this time supported the U.S. decision to pursue SDI. Even though the 1972 Anti-Ballistic Missile (ABM) Treaty was still in effect and numerous groups opposed weaponizing space, the idea that SDI could topple the USSR and therefore help bring about an end to the Cold War overwhelmed these other issues and convinced President Reagan among others that this system housed strong utility.

As mentioned in Chapter II, the concept of dissuasion as a U.S. defense policy arose from several factors, one of which was the necessity of a policy that offsets the limitations and dangerous consequences of deterrence and assurance. Unfortunately, merely transposing the conditions for deterrence or assurance success does not do justice to the fact that dissuasion is an entirely new strategy with its own characteristics. Therefore, any attempt to define the conditions necessary for this defense policy to succeed will involve a great deal of speculation. In addition, while U.S. strategists can analyze data in an attempt to predict the future course of military procurement (i.e., dissuasion seeks to avoid arms races), no one is entirely sure how it will actually unfold. Furthermore, while several types of counter space systems were discussed in Chapter III, these were all based on journalistic references. The secretive nature of military weapons procurement leads to a less than an exact accounting of actual OCS systems. Nonetheless, even given these constraints, theorists can make certain logical arguments that define conditions when dissuasion is most likely to be successful.

This thesis proposes that dissuasion's best chance for success is when China confronts the following conditions:

- *Militarily it cannot employ effective offensive counter space weapons*
- *Economically the cost of developing these systems is simply too high*
- *Diplomatically the instability caused by developing such devices outweighs the benefits enjoyed by stable diplomatic relations with the U.S. and others.*

This chapter explores each of these conditions individually, although establishing the military conditions is the primary endeavor given the tactical nature of this specific dissuasion policy. More strategic level dissuasion policies will involve correspondingly

more emphasis on the diplomatic conditions. Regardless, no conditions can be discounted, but must be analyzed within the overall context of the intended objective.

B. MILITARY CONDITION

1. Criterion #1 – Only Target Non-Operational or Emerging Systems

China already possesses the capability to build, launch, and operate space systems. In fact, recent modernizations efforts have sought to propel China's space program into a more Western-style infrastructure. The Commission of Science, Technology, and Industry directs the civil and military space programs, which is akin to the Office of Science and Technology in the U.S. Whitehouse. In addition, portions of the civil space programs fall under the China Aerospace Corporation and the China National Space Administration, which loosely corresponds to the National Aeronautical and Space Administration (NASA) in the U.S.[86]

From a space launch perspective, China has a solid history of successes. Currently, only a handful of states or organizations (U.S., Russia, China, European Space Agency (ESA), India, Israel, and Japan) possess space launch capacity. China's inventory of space launch systems is substantial, and as of 2003, they had launched 73 satellites.[87] China's Long March series of rockets (12 different versions) possesses the capability to place satellites into low earth orbit (LEO) and geostationary orbits (GEO). China is looking to increase its heavy lift capacity to a gaudy 25 tons for LEO and 14 tons for GEO. These numbers compare favorably to the European Space Agency (ESA) and the U.S.'s space lift fleet.[88] As a reference point, consider that the Long March rockets could easily lift two of the larger U.S. defense satellites on orbit (e.g., Defense Support Program (DSP) satellites weigh less than 3 tons at 5,250 lbs and the Military Strategic and Tactical Relay (MILSTAR) satellites weigh 5 tons at 10,000 lbs).

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[86] David Baker, "Government and Non-Government Space Programs, China," Space Directory, Jane's, 14 Oct 04, http://www4.janes.com/subscribe/jsd/doc_view.jsp?K2DocKey=/content1/janesdata/yb/jsd/jsd_0528.htm@current&Prod_Name=JSD&QueryText= (accessed 15 May 05)

[87] 2004 Space Almanac, p. 47

[88] Philip Clark, China Country Information, Space Directory, Jane's, 1 Sep 04, http://www4.janes.com/subscribe/jsd/doc_view.jsp?K2DocKey=/content1/janesdata/yb/jsd/jsd_0334.htm@current&Prod_Name=JSD&QueryText=#img (accessed on 11 May 05)

Furthermore, the ability to carry more weight may indicate that China seeks to place multiple satellites in orbit with one launcher. This is a modern space launch tactic and was used regularly during the implementation of the launching of the Iridium constellation in the late 1990s.

China carries out its space launch activities at three locations. Jiuquan serves as the manned space flight launch site, Taiyuan is used for LEO launches, and Xichang is the primary launch pad for GEO satellites.[89] Collectively, the ability to launch into the two most popular and meaningful orbits (LEO and GEO) and the high success rate of Chinese space launches has contributed to making China's space launch industry not only highly regarded and prestigious within China, but also attractive to foreign commercial vendors and state governments. Consequently, China has successfully launched 27 foreign owned satellites.[90] China is also actively engaged in multilateral space system development. For example, China developed a new SATCOM system, the DFH-3 series, in a joint venture with Germany,[91] on October 21, 2003, China launched an "advanced multi-spectral remote sensing spacecraft developed in conjunction with Brazil,"[92] and in 2006, China will launch a Nigerian satellite that it was also contracted to build.[93] However, even though China has made significant progress in its efforts to modernize, including its achievements in space, according to the Council on Foreign Relations (CFR) it is still decades behind the U.S.

> China is far from becoming a global military power and it remains at least two decades behind the US in military technology and ability.[94]

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[89] "China's Three Major Space Launch Bases," China Daily Online Edition, 15 Oct 03, http://www.chinadaily.com.cn/english/home/index.html (accessed 11 May 05) and "Satellite Launch Centers," China.org website, 18 Oct 04, http://www.china.org.cn/english/SPORT-c/77178.htm (accessed 11 May 05)

[90] White Paper: Full Text of China's Space Activities, 22 Nov 00, FBIS CPP20001122000046

[91] David Baker, "Government and Non-Government Space Programs, China"

[92] Craig Covault, *Aviation Week and Space Technology*, New York: 27 Oct 03, Vol 159, Iss 17, p. 30

[93] "Nigeria to Launch Chinese-Assisted Communications Satellite in 2006," Paris Agence France Presse News Release, 9 Feb 05, FBIS AFP20050209000185

[94] Adam Segal, "Chinese Military Power," Report of an Independent Task Force Sponsored by the Council on Foreign Relations Maurice R. Greenberg Center for Geoeconomic Studies," Council on Foreign Relations (CFR), 2003, p. 2, http://www.cfr.org/pdf/China_TF.pdf (accessed 11 May 05)

In sum, the PRC already possesses the ability to build, launch, and operate space systems. Moreover, they not only recognize the benefits that space provides, they actively harness these benefits and integrate them into normal operations. In addition, even though China's overall space program is "decades behind" U.S. space capabilities, it is nonetheless an existing threat and not merely a non-operational emerging industry.

2. Criterion #2 – Only Target OCS Systems

Another aspect to consider concerning China's current space program is that as each year passes the services provided by these systems become further embedded within normalized Beijing operations. Consequently, the Chinese have developed a dependency on these systems that would be difficult to replace. To try to dissuade Chinese leaders to abandon existing commercial and military space programs does not seem realistic. In addition, the often times dual commercial – military nature of space systems makes them appear hazy in any strategy's targeting scope. This situation forces U.S. strategists to narrow the dissuasive strategy to space systems serving only military functions as well as systems that are non-operational (i.e., emerging). The emerging systems that most closely resemble these criteria are anti-satellite missiles, lasers, directed energy, and satellite links jammers type weapons platforms (reference Table 1). Many of these OCS systems are in the research and development phase and seek to provide traditional military destructive capability. Also, they are still relatively unknown or not in use. Consequently, China does not operate these systems or currently enjoy their benefits. Therefore, dissuasion, a strategy specifically designed to deal with emerging threats, is the most appropriate policy tool to counter PRC OCS systems.

Table 4. Offensive Counter Space (OCS) Threats[95]

	Terrestrial Node Attack	Links Jamming	Lasers	Electro-magnetic Pulse (EMP)	Kinetic ASAT[96]	Information Operations
Emerging or Existing	Existing	Emerging – Existing	Emerging	Emerging[97]	Emerging[98]	Emerging
Space or Ground Based	Ground	Ground	Both	Space	Both	Ground

In addition, by targeting weaponized systems the U.S. can potentially tap into the large "no weapons in space" bandwagon that currently exists. Since a number of international treaties currently ban weapons of mass destruction (WMD) in space, which by itself is a very elusive definition and since the U.S. military greatly fears the possibility of space weapons increasing the already debris-riddled atmosphere, a dissuasive campaign against these types of systems already has the momentum and leverage of existing policies and interests.[99] However, the impetus to keep space "weapons free" really only applies to space-based OCS systems such a space-based laser or a space-based ABM system and to destructive OCS systems like a kinetic ASAT or space mine that would create a debris cloud in space. Other OCS systems that execute their missions through temporary or reversible means lay within a gray area that so far seems to be more acceptable to the international community. If the Russian attack on

[95] AFDD 2.2-1, Counterspace Operations, pp. 4, 33 lists the six OCS threats in Table 1. The remaining information in the table is based on data contained in this thesis.

[96] Kinetic ASAT systems could consist of ASAT missiles like those produced by the U.S. and USSR during the Cold War or space mines and parasitic micro-satellites which are not currently employed but certainly discussed in some "space weapon" forums and articles.

[97] Existing atomic weapons have the inherent capability to produce an EMP type affect (if detonated in space) and some theorists speculate that in certain cases states may consider employing nuclear weapons as a means to target space systems. However, this seems extremely risky and only plausible if the aggressor accepts the risk of nuclear retaliation. Therefore, this category of OCS weapons implies non-nuclear EMP weapons designed specifically to target space-based platforms.

[98] Both the Soviets and U.S. tested kinetic ASAT systems, although these system were shelved shortly after initial development (late 1970s and early 1980s). Therefore, the ASAT systems still fall into the "emerging" threat category.

[99] "United Nations Treaties and Principles on Space Law," Office for Outerspace Affairs, United Nations Office at Vienna, 10 May 04, http://www.oosa.unvienna.org/SpaceLaw/treaties.html (accessed 8 May 05)

Chechen cell phones or the Cuban attack on the Voice of America were carried out through a destructive OCS platform like a kinetic ASAT that permanently eliminated a space-based SATCOM system, then these events would not have been as easily forgotten.

Unfortunately, by targeting these types of systems it would be difficult for the Pentagon to justify the pursuit of similar OCS systems for its own use. If the Washington does choose to pursue these systems but still engage in dissuasion against them for others such as Beijing, then it becomes problematic to use public support and international law as a strategy springboard. Furthermore, international law and concerns over space debris do not apply to the OCS ground-based satellite links jammers that have emerged in recent years.

Another characteristic of this criterion is that it re-enforces the notion that dissuasion aims to target emerging threats, not existing or engaging threats (reference Figure 2 and Table 1 in Chapter II). Of course, there is a hazy line between emerging and existing threats. It is likely that American policy makers might still consider jammers to be an emerging threat due to the relatively crude and experimental nature of the few existing devices, the less than sophisticated employment tactics, the rudimentary doctrine, and the lack of integration into other military operations. Subsequently, this criterion then avoids depriving China of a system that they currently depend upon as well as targeting something used by civilians. Another advantage is that this criterion aims to reduce the same military space weapons that many international and state organizations seek to abolish. Finally, the probability that China is already developing OCS weapons means that U.S. policy makers have an actual emerging threat to dissuade.

3. Criterion #3 – U.S. Systems Are Unassailable, Easily Replenished, or Substitute Sources of Similar Capability Exist

The last criterion of the military condition is that the U.S. possesses better defensive space measures than China's offensive space weapons. This criterion is slightly different in format from the previous ones. It is comprised of three alternatives, but only one needs to be present for the criterion to function. One option of this criterion is that the unassailable nature of U.S. systems would present such an insurmountable dilemma to the Chinese that they would have no logical alternatives but to abandon any

attempts to develop offensive space weapons. However, this option requires the ability to completely protect all the elements of a given space system (terrestrial nodes, links, and space nodes - Reference Figure 11, Chapter III) through defensive counterspace (DCS) tactics. Highly effective defensive measures could possibly consist of on-board mechanisms that could either maneuver the satellite away from the threat, destroy the threat as it approaches, or harden key components and sensors on-board the spacecraft. [100]

Satellite ground stations that provide satellite command and control, filter and interpret satellite-derived information, and use satellite-based knowledge to support the efforts of other entities would also need to be unassailable since their destruction produces the same effect of rendering the space system unusable. Even with the on-going efforts of the Department of Homeland Security to include the establishment of U.S. Northern Command, many terrestrial nodes inside and outside the U.S. are not protected well enough to stop a debilitating attack. Finally, and possibly most importantly, the links connecting terrestrial ground stations with orbiting space nodes would need to be secure from jamming, interference, and spoofing.

Table 5. Defensive Counter Space (DCS) Capabilities[101]

Passive Measures	Camouflage, Concealment, and Deception (CCD)	System Hardening	Dispersal of Space Systems
Active Measures	Maneuver and Mobility	System Configuration Changes	Suppression of Adversary Counterspace Capabilities (SACC)

The concept of replenishment is another option for this criterion. This option entails the U.S. replenishing space systems faster than the destruction caused by Chinese space weapons. China would have to ask itself, "Why attack U.S. space systems if the systems will in effect be rapidly replaced in such a way that U.S. capabilities remain

[100] AFDD 2-2.1 Counterspace Operations, p. 3

[101] AFDD 2.2-1 Counterspace Operations, pp. 25-27

intact?" Unfortunately, this option requires two nearly unachievable capabilities for the U.S. One is the ability to rapidly launch multiple spare satellites within minutes of destruction and quickly make them operational, and the other is having the necessary spare satellites ready and loaded on spacelift vehicles. Even with the advent of the newest launch vehicles, spacelift processing times will still take months, not the minutes required for unassailability.[102] Moreover, the high cost of satellites, sometimes as much as $1 billion makes spare satellite inventory financially unacceptable.

However, the availability of substitute sources to space systems may provide another avenue to achieving this criterion. If the U.S. can produce sufficient air, land, and sea-based platforms to compensate for attacks on space-based platforms then that would contribute to dissuading a potential adversary. For example, sufficient air-based ISR platforms may allow U.S. planners to compensate for the loss of space-based ISR systems. Unfortunately, there are certain inaccessible regions that air, land, or sea-based ISR sensors simply cannot reach such as Moscow, Tehran, and Beijing. These deeply land-locked and highly important cities offer no viewable access to U.S. air, land, and sea-based sensors. In sum, the requirements for military criterion #3 are unlikely to be achieved since the U.S. does not have the capability to make space systems immune from destruction, easily and quickly replenished, or able to be compensated for by other air, land, and sea systems.

C. ECONOMIC CONDITION

From an economic standpoint, dissuasion is most likely to be successful if China's financial resources are extremely limited whereas U.S. resources are relatively abundant. The concept behind this condition is that if China cannot afford to keep pace with American weapons procurement, and more specifically with respect to OCS and DCS space technologies, than they will be unable to field systems capable of defeating U.S. weapon systems and hence will consciously decide not to engage in an arms race. This condition requires a highly robust U.S. economy that could afford to take full advantage of the technological space capabilities that exist. Simultaneously, China would need to be mired in a sluggish and extremely limited economy that is forced to

[102] AFDD 2-2 Space Operations, p. 34

manage very constrained defense spending options even more than they currently do. Consequently, the large gap in finances creates an economic condition where the U.S. is able to invest in the superior defensive space capabilities that would ward off any conceivable OCS system introduced by the Chinese.

1. Criterion #1 – Basic Economic Strength

At $10.5 trillion, the U.S. economy is nearly twice that of China, which boasts the second highest GDP at almost $6 trillion.[103] However, is it strong enough that China is dissuaded from developing space weapon systems? Does this gap in revenue cause PRC leaders to pause at every decision and analyze the cost-benefit relationship? Surely, all leaders make such assessments regardless of the economic gap. However, what the economic condition is trying to define is whether the financial gap is large enough that PRC leaders not only pause, but also recognize the impossibility of overcoming the gap. Unfortunately, every year China closes the financial gap that exists between them and the U.S. China's real rate of growth has outpaced the U.S. growth by nearly a 4-to-1 margin over the last few years.[104] Moreover, with the Pentagon scrambling to make ends meet due to the incredible drain on military budgets stemming from ongoing operations in Afghanistan and more significantly Iraq, its seems unlikely that U.S. decision makers will see a windfall of funds to dole out to DCS systems when the threat from OCS systems is arguably weak.

Comparing China's budget with respect to its regional interests sheds some light on not only its position compared to the U.S., but also with respect to its regional competitors. China's $56 billion defense bill in 2002 is 40% more than Japan and 800% more than Taiwan's. This is due in large part to the 300% increase in defense spending that occurred between 1996 and 2004.[105] However, military spending per capita flips this relationship upside down (reference Table 3). As the most populous country in the world, this data seems logical. Additional statistical computations exist that support the

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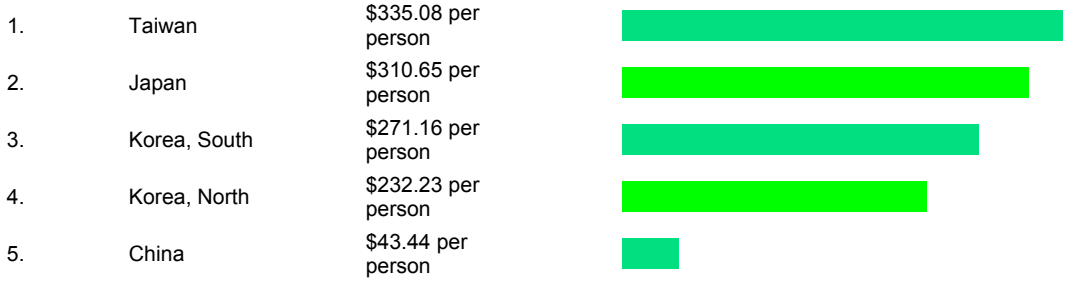
[103] World Fact Book, Central Intelligence Agency (CIA), 1 Jan 04, http://www.cia.gov/cia/publications/factbook/ (accessed 8 May 05), and GDP, Nation Master, Dec 03, http://www.nationmaster.com/graph-T/eco_gdp (accessed 8 May 05)

[104] World Fact Book

[105] Nation Master, Military Expenditures

notion that China's forces are getting increasingly more money each year. However, other statistics support the notion that from a relative standpoint of per capita or as a percentage of GDP, Chinese defense spending is low.

Table 6. East Asia Military Expenditures per Capita[106]



Unlike during the climactic years of the Cold War where U.S. strategists could spend at will and in turn support the collapse of the Soviet economy, the Sino-American economic relationship is much different. During the 1980s, Moscow's command driven economy was plummeting while Washington's market economy was soaring. Today, Beijing's market-based economy is soaring faster than the U.S. economy, and it is highly unlikely that U.S. strategists in this era have the freedom to spend at will.

2. Criterion #2 – Modern Military Industrial Complex

Current U.S. naval capabilities offer an example of this criterion. The substantial industrial tail that goes along with the sizable U.S. naval fleet would be difficult for another country to imitate. The amount of finances required to build 12 aircraft carriers, associated support vessels, docking facilities, logistical supplies, capable seamen, as well as executable doctrine and training is well beyond anything that China or any other country in the world could afford. In essence, the gap between the U.S. navy and other navies is so wide that states are dissuaded from pursuing a large capital fleet because of the economic costs associated with such a venture is just too high, relative to the strategic advantages it would afford. Japan and Germany both attempted to pursue a navy that was beyond their means in the late nineteenth and early twentieth centuries, and both failed at sustaining it. A host of arguments can be made that explain this failure and some even argue that it had less to do with economics and more to do with the long-standing

[106] Nation Master, Military Expenditures

interests of these states. Regardless of exactly how much economics was a factor, whether it was the most important or simply one of many, it was nonetheless a factor in these failures.

In certain instances, U.S. policy makers actually construct international relationships that encourage states NOT to pursue naval build-up. These policy makers offer up U.S. naval services with specific caveats that compel states not to undertake a military buildup in exchange for U.S. protection. In these cases, the arrangement benefits both states. The U.S. may garner basing rights while the smaller state saves money and gains protection. While not as demanding as sustaining a modern navy, nurturing a modern space program carries many of the same requirements.

However, one needs look no further than China's national defense infrastructure (i.e., military-industrial complex) to witness repeated failures to establish modern industries and practices. David Shambaugh notes this problem in his book *Modernizing China's Military*.

> China's persistent search abroad for military technology and hardware has been born of necessity and is a clear indication of indigenous failure: China's own industries, scientists, and technicians have consistently failed to keep pace with either their nation's defensive needs or global standards.[107]

So, does China possess the type of military-industrial complex necessary to sustain its security endeavors? Specifically, does it at least possess enough of an industry to sustain capable OCS systems? The former is more difficult to answer, but certainly, the answer to the latter is "Yes." As discussed in Chapter III, OCS systems need not consist of space-based platforms with highly sophisticated capabilities. Crude ground-based jammers have already proved sufficient to negate advanced command and control systems. Conversely, it is less apparent that China could develop a space-based OCS capability.

[107] David Shambaugh, *Modernizing China's Military: Progress, Problems, and Prospects*, p. 225

3. Criterion #3 – Diversification of Interests

Another key component of an economic analysis between China and the U.S. is a comparison of each state's security interests. Figures 1 and 2 provide a snapshot of how each state military is set up to handle the security of interests. Compared against the U.S. breakdown for military regions it is evident that the Chinese only need to expend resources to defend its existing continental territory. The only exception, although a significant one nonetheless, to this situation is Taiwan, where the PLA is investing resources to develop a legitimate amphibious assault force. In contrast, notice the spread of U.S. regions across every square inch of the globe and includes bases, ports, and liaisons in many countries and on every continent. The economic consequences of this vast military diversification are the necessity to spread out defense dollars across these regions. Furthermore, the U.S. must develop and sustain the capability to transport forces rapidly to and from each region. Conversely, the logistical cost to Beijing is considerably less than it is for Washington.

This translates into a similar relationship for space system expenditures, where China only needs to support enough space systems to enhance regional operations whereas the U.S. must maintain enough systems to simultaneously support multiple regions for a continuous global presence.

Figure 12. China's Military Regions

Figure 13. U.S. Military Regions

In sum, it does not seem evident that the economic conditions exist to support dissuasion. Even if one was to consider that China must spread its wealth across four times as many people and that the PRC military-industrial complex is riddled with

problems, there just is not enough of a gap that the U.S. can spend unlimited amounts of money to counter any OCS procurements made by China. This situation is especially difficult given the number and scope of global commitments supported with U.S. defense dollars.

D. DIPLOMATIC CONDITIONS

1. Criterion #1 – OCS Systems Violate International Laws and Norms

Putting China in a position where the employment of the OCS capabilities they are currently developing is in violation of international law is one aspect of the diplomatic condition necessary for dissuasion success. Strong and enforceable international laws or at minimum norms prohibiting the development of weaponized space platforms makes a formidable road block to their development. Currently, the 1967 Outer Space Treaty encourages the use of space for "peaceful purposes," and prohibits the placement of nuclear weapons or WMD in space.[108] However, this treaty was designed and intended to serve the Cold War and it is clearly targeting a specific sub-set of space weaponry. In fact, this treaty does leave the door open for space-based weapons as long as they do not contain nuclear or WMD material. Of course, the term WMD can be interpreted loosely, but few would consider a space-based laser or space mine to fit into this category. Consequently, some states have attempted to expand the laws of outer space and make more specific constraints on the placement of weapons in space. The Chinese and Russian delegations to the Prevention of an Arms Race in Outer Space (PAROS) strongly supported the notion of forbidding weapons in space.[109]

However, this condition losses strength if the U.S. does not adhere to the same set of laws. If the U.S. does indeed weaponize space with lasers or kinetic ASAT systems, whether as primary OCS systems or indirectly as part of a more elaborate ABM system, then it becomes extremely problematic for the diplomatic condition to support dissuasion.

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[108] 1967 Outer Space Treaty

[109] UN General Assembly, Prevention of an Arms Race in Outer Space (PAROS), UN GAOR, 58th Session, UN Doc. A/RES/58/36, 8 Jan 04. http://daccessdds.un.org/doc/UNDOC/GEN/N03/455/07/PDF/N0345507.pdf?OpenElement (accessed 29 May 05). For a more thorough discussion of the legal ramifications of weapons in space read Elizabeth Waldrop, "Weaponization of Outer Space: U.S. National policy," *High Frontier*, Vol 1, No. 3 (Winter 2005), USAF Space Command, http://www.peterson.af.mil/hqafspc/news/images/JournalWinter05Web.pdf (accessed 19 May 05)

Once the race for space-based weapons begins, then any attempt at dissuading OCS systems from space is over. Space hawks like Everett Dolman actively argue that this is the best time for the Pentagon to field an armada of space-based weaponry. Since no other state can match U.S. space superiority than why wait until they can to field these types of weapon systems. Furthermore, Dolman believes that Beijing's space capability is much closer to U.S. standards, more like ten to fifteen years behind, than one might be led to believe considering that the PRC uses first generation imaging systems, technology used by the U.S. during the 1960s.[110] There is nothing wrong with this position as long as it aligns with the rest of the U.S. defense strategies.[111] Unfortunately, if the U.S. wishes to dissuade China from entering into a space arms race, then this aggressive *Astropolitik* position just does not mesh with the broader security concerns.

Another problem with this criterion is that certain space weapons such as links jammers are not viewed as illegal within the confines of the 1967 Outer Space Treaty or even within some viewpoints of PAROS and therefore provide China a viable option to sidestep this criterion. In addition, with the introduction by the U.S. Air Force of the Counter Communications System (CCS), the space arms race has already taken a significant step that will be difficult to dissuade other states from taking. As mentioned, several other states already posses these types of OCS systems, and at least one of which is a U.N. Security Council member, thus the likelihood of links jammers becoming subject to a U.N. treaty is low. Moreover, with U.S. territory vulnerable to attack, terrestrial nodes long deemed secure just by their location within the U.S. are more susceptible to attack.

2. Criterion #2 – OCS Systems Unnecessary Due to Strong Sino-American Ties

Diplomatically, the U.S. must build ties with China to convince them that space weapons are unnecessary in tomorrow's world because the U.S. - China connection is so strong that future conflict is unrealistic or at least that the strategic gains of future conflict

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[110] Personal interview with the author, School of Advanced Air and Space Studies (SAASS), Air University, Maxwell AFB AL, 18 Mar 05

[111] Everett Dolman, *Astropolitik* and Everett Dolman, "Strategy Lost: Taking the Middle Road to Wherever," *High Frontier*, Vol 1, No. 3 (Winter 2005), USAF Space Command, pp. 32-34 http://www.peterson.af.mil/hqafspc/news/images/JournalWinter05Web.pdf (accessed 19 May 05)

are less than the costs. Of any of the conditions and their criterion, this one is the easiest to accomplish because many of its foundational elements already exist: the United States and China are important trading partners; they actively cooperate on a range of international issues, and so on. However, there are actions that may mitigate this criterion's chance of success.

First, with the European Union (EU) removing its military arms embargo that was enacted after the Tiananmen Square crackdown in 1989 while the U.S. keeps its in force China may have less need to maintain as strong of a relationship with the U.S as previously undertaken. Second, strong ties do not guarantee peace. Prior to WWI, Germany and Britain both prospered as each other's largest trading partner. Therefore, while strong diplomatic and economic relationships may guide state strategy, it is the security of state interests that predominantly drive state actions. One approach that could reinforce this criterion from eroding is stronger ties between U.S. and Chinese space industries.

Denny Roy of the Asia-Pacific Center believes that the Chinese position with respect to nuclear weapons is analogous to their position on space weapons, that if the U.S. reduces or eliminates its stockpile or ambitions in those respective areas then the PRC will reciprocate.[112] The fact that China and Russia both have tried to push a weapons free space agenda in the UN supports this belief. The implication of this is that an opportunity exists to strengthen this criterion if U.S. leadership chooses to support more aggressive anti space weapons treaties and policies. Unfortunately, it seems likely that President Bush will advocate a space policy that strongly hedges against the need to develop and operationalize space-based weaponry in order to protect U.S. dependency.[113] Therefore, it is very unlikely that any country will react to this policy by giving up its own space weapon developments and instead states are more likely to continue pursuing such devices.

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[112] Personal interview with the author. Asia-Pacific Center for Security Studies (APCSS), Honolulu HI, 24 May 05

[113] Tim Weiner, "Air Force Seeks Bush's Approval for Space Weapons Programs." New York Times, 18 May 05

3. Criterion #3 – OCS Systems Would Target China's Own Space Information

Diplomacy can create a space dependency between the two states such that China's space weapons development would only end up damaging systems they use themselves. By providing military type information to China, the U.S. becomes an ally and not a foe. Stronger ties between Washington and Beijing and the exertion of influence through the UN and other international organizations can create a diplomatic condition that does not allow China to develop OCS systems.

One in-road to satisfying this criterion is the development of Chinese space systems by U.S. manufacturers. Indeed, several PRC space systems have been built by American firms, such as AsiaSat-1, -3, and -3SA, which were built by Hughes and AsiaSat-2 which was built by Lockheed Martin.[114] In fact, many experts, such as Elizabeth Van Wie Davis of the Asia-Pacific Center believe that Beijing is much more likely to procure rather than produce its space program.[115] Another noted space expert, James Oberg, recently testified to congress with assessment of China's space program. One highlight of the testimony was his comparison of the PRC and USSR space programs. Using two nearly identical images, one of Yuri Gagarin's space flight in 1961 and one of Lang Liwei's in 2003, Oberg effectively underscored the fact that China is using old Soviet systems to build up its own space program.[116] Besides the obvious implication that China lacks the ability to produce many of its own systems, another implication is that China is ripe for space collaboration and it may be in Washington's best interest to spearhead these efforts rather than the European Union.

In sum, combining the facts that international laws and norms exist discouraging the weaponization of space, the strong interdependence between the U.S. and China, and that potentially Chinese and American forces may well be using the same space systems (e.g., IntelSat) simultaneously makes for an overall favorable diplomatic condition.

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[114] Phillip Clark, China Country Information

[115] Personal interview with the author, APCSS, Honolulu, HI, 24 May 05

[116] Testimony of James Oberg: U.S. Senate Science, Technology, and Space Hearing: International Space Exploration Program, 27 Apr 04. http://www.spaceref.com/news/viewsr.html?pid=12687 (accessed 29 May 05)

However, much more in this area needs to be done to sustain this momentum. China actively engages with the EU and ESA to advance its space capabilities. Furthermore, the U.S. seems reluctant to sign on to proposed treaties that call for more strict weapons free space criteria.

E. SUMMARY

This chapter presented three conditions that must be present for dissuasion to succeed. Militarily, a dissuasion policy must target emerging OCS systems not currently providing services to the PRC or integrated into existing PLA doctrine. In addition, U.S. space systems must become unassailable to eliminate the enticement afforded by OCS capabilities. In essence, why would China pursue counter space technologies if the U.S. system were impervious to such devices? While portions of this condition are executable, the last criterion (i.e., unassailability) is far from becoming a reality.

Economically, dissuasion has a better chance to succeed when the U.S. economy is vastly superior to the PRC. However, while this superiority at first appears impressive, it will soon give way to the burgeoning Chinese economy, which is rising dramatically. In addition, the PLA does not need to spread its resources as thinly as the U.S. since its interests are constrained to its own territory, to include Taiwan. Diplomatically, the possibility exists that this condition can be more easily fulfilled compared to other conditions. International treaties and norms exist that support a weapons-free space environment. Furthermore, Sino-American ties are reaching new heights, and although more could be done, both countries rely heavily on each other. Moreover, as space assets become increasingly international and commercialized, they become less and less desirable for military targeting.

Assessing the environment is an important step for any U.S. defense policy. Just as one dips a toe or finger into the pool before taking the plunge, so to should U.S. strategists dip a "toe" into the military, economic, and diplomatic "pools" before embarking on a strategy of dissuasion. However, in the case of dissuading China's OCS procurement, the conditions are not present to support a strategy of dissuasion. This assessment will be discussed in more detail in the conclusion.

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V. CONCLUSION

A. SUMMARY OF FINDINGS

Analyzing defense policies is important because it affords refinement of current strategies and it helps leaders design objectives that are more effective in the future. Unfortunately, the very nature of international relations makes collective agreement on policy attributes rare. A successful piece of one policy may in fact mean that another piece of that same policy failed. Even within the same state, theorists spend countless pages in debate over classifying a policy as success or failure. Furthermore, a policy can produce multiple outcomes as the Cold War exemplifies. Touted as a success, the global stability caused by the deterrence policies of the twentieth century cost the U.S. and others irrelevant weapon systems, counterproductive budgets, and regional instability. Yet, the process of analyzing these policies provides valuable information to proponents and opponents alike. In addition, understanding the outcomes of past policies help to frame the conditions for successful policy in the future.

For example, President Wilson's decision to enter WWI in the spring of 1917 was necessary to prevent a victory by the Germans. In addition, this policy was effective in contributing to a substantial rise in U.S. power. Granted, the costs of this policy in terms of lives and taxpayer money were enormous, but earning a place at the peace table was a key step in increasing the global position of the U.S. Conversely, many theorists and world leaders point to the U.S. policy of pre-emption in Iraq as counterproductive because even though it was believed necessary to stabilize the region and reduce the threat of WMD and terrorism, this policy has had the opposite effect. Opponents point to the substantial increase in insurgency and terrorism that has sprung up in Iraq since the end of official hostilities in May 2003.

Nonetheless, discussing these policies and their impact is important to future strategists. The lessons learned from the failed appeasement policies prior to WWII were directly responsible for the deterrence policies of the Cold War. Fearing a similar crisis as the one sparked by Nazi Germany, the international community embraced deterrence because it meant that the rising power of the Soviets would be equaled by that of the

Americans. Consequently, Stalin could not simply roll over Europe as Hitler had done in 1941. However, as experts began to analyze the nuclear arms race, many people realized that deterrence carried its own bag of counterproductive and failed policy results. Today, policy makers in Washington are counting on dissuasion to avoid some of the pitfalls of deterrence as well as bolster other defense policies by preventing specific arms races. China's space weapon programs offer one such target for dissuasion.

Unfortunately, assessing the utility of a dissuasive space policy is challenging. A host of problems contributes to this challenge. First, China already has operational space systems providing them with numerous services. Second, it is difficult at times to distinguish between military and commercial space systems. Third, even if a state does not actively launch its own space systems, other states or commercial systems can provide the desired space-based information. Due to these challenges, it is imperative that any dissuasion strategy aimed at China's space program target offensive counter space (OCS) systems such as space-based ASAT platforms and ground-based jammers.

The military only system criterion represents one portion of the overall military, economic, and diplomatic conditions necessary for the successful dissuasion of China's space weapons. Other conditions and their respective criteria, summarized in Table 7, are necessary. Conditions include the unassailability of U.S. systems, the overwhelming U.S. economy, and the strong interdependence of U.S. – PRC relations. Unfortunately, it is neither possible nor highly likely that many of the conditions necessary for successful dissuasion exist now or will in the future. For example, it is nearly impossible for the Pentagon to make its systems unassailable, whether it is through advanced defensive mechanisms, replenishment, or alternative source capabilities. The economic condition looks similarly unattainable since the China – U.S. economic gap is rapidly closing. In the future, China may surpass the U.S. as the biggest economy in the world and would place itself in a position to develop more and better space systems.

Table 7. Summary of Dissuasive Conditions with Estimate[117]

Categories (with estimate)	**Conditions Required for Dissuasion Success (with estimate)**	
Military **NO** (+) China OCS systems present a viable target (-) U.S. unable to satisfy unassailability, etc.	China **YES**	U.S. **NO**
	Criterion #1 Non-Operational (Emerging) (Yes)	Criterion #3 Unassailable (No)
	Criterion #1 Military Only (Yes)	Criterion #3 Easily Replenished (No)
	Criterion #2 OCS (Yes)	Criterion #3 Alternative Sources Exist (Sometimes)
Economic **NO** (+) China lacks modern Mil-Industrial Complex (-) U.S. economy not strong enough (-) U.S. interests spread widely	China **NO**	U.S. **NO**
	Criterion #1 Overall Strength - *Limited* (Yes)	Criterion #1 Overall Strength - *Unlimited* (No)
	Criterion #2 Aged Mil-Industrial Complex (Yes)	Criterion #2 Modern Mil-Industrial Complex (Yes)
	Criterion #3 Diversification of Interests (No)	Criterion #3 Consolidation of Interests (No)
Diplomatic **YES** (+) Considerable impetus to NOT develop OCS systems	China **YES**	U.S. **YES**
	Criterion #1 OCS Systems Violate International Law and Norms (Depends)	Criterion #1 OCS Systems Violate International Law and Norms (Depends)
	Criterion #2 OCS Systems Unnecessary Due to Strong Sino-American Ties (Yes)	Criterion #2 OCS Systems Unnecessary Due to Strong Sino-American Ties (Yes)
	Criterion #3 OCS Systems Affect China's Own Information (Possibly)	Criterion #3 OCS Systems Affect U.S.'s Own Information (Possibly)

[117] Within each criterion, a "Yes" implies that the conditions are ripe for dissuasion and "No" answers imply the opposite. A "+" means that the stated criteria is favorable for a dissuasive policy and a "-" means that these criteria detract from dissuasion. The more "Yes" and "+" assessments means the more likely dissuasion will succeed.

Organizing these conditions into Table 7 aids in the discussion of dissuasion, but it should not be seen as a linear equation. These conditions represent the logical analysis of U.S. defense strategies in today's environment. However, they do not account for or replace judgment and risk. U.S. leaders must weigh these conditions against other issues and judge if the risk of attempting dissuasion is worth the consequences. The reason these policies make up larger defense strategies is exactly because nothing is certain, and a proper blend of strategies is usually the best choice as well as insurance against one specific policy's failure. If U.S. assurances to Taiwan fail to prevent them from openly declaring independence, then hopefully America's deterrence policies will still keep China from attacking across the straits. All a policy maker can do is analyze the best information available and then make an educated decision about how to proceed. In essence, this is the art or skill required for most decision-making processes.

Examining the utility of dissuasion is a worthwhile exercise. The U.S. and others have invested heavily in traditional defense policies. While the placement of U.S. service members, conventional forces, and nuclear weapons in Europe assured NATO that Soviet forces would remain behind the Iron Curtain, it nonetheless came at a substantial cost. The policy of deterrence proved worthwhile during the Cold War; although, like assurance, it extracted a cost from the U.S. and the rest of the world. The tradeoffs for nuclear stability were regional instability and the diversion of the global economy away from other areas such as education and health care. In addition, the policy of defeat, played out in the numerous wars of the past century, was clearly needed in situations like WWII, but again the costs were high.

In today's security environment, American leaders must make countless decisions with respect to the interests of the state. One of these decisions is determining the tradeoff between dissuading other states from pursuing certain weapon systems and the potential consequences of what these countries do in response to this policy. The response to U.S. superiority on the seas is mini-subs and the response to U.S. superiority in the air is surface-to-air missiles (SAM). Figure 1 in Chapter I expanded this type of cause-effect relationship on a much broader scale by depicting how the unmanageable nuclear stand-off and overwhelming might of Washington's conventional forces have

caused other states and non-state actors to pursue weapon systems and tactics that avoid these strengths entirely. Unfortunately, whether this was the intended "channel" envisioned by the drafters of the 2001 QDR or not, the dissuasive consequences of the overwhelming U.S. military power have been largely detrimental since the Pentagon is ill prepared to handle the irregular or disruptive challenges that flow from this type of policy. The notion of "channeling" threats is admirable, but if the channeler is not prepared to catch the channeled, then the concept does not work (e.g., insurgency in Iraq or Cubans jamming U.S. satellite broadcasts).

If dissuasion is pursued with respect to illegal space weapons, it may simply cause U.S. adversaries to produce more and better types of links based OCS systems that fall outside of international law. Even though some space weapons have proved ineffective, like the GPS jammer used against coalition forces in Iraqi Freedom, others, like Cuba's satellite jammers that targeted the Voice of America broadcast, have been remarkably capable at affecting U.S. space systems. Furthermore, these types of disruptive technologies provide a glimpse as to how future adversaries will attempt to deny the U.S. access to space.[118] It seems that a combination of other policy tools may present the most viable option to preventing a space arms race. By leveraging existing space law, advocating space arms control, increasing economic interdependence and using skillful diplomacy, the U.S. may prevent a space race as well as avoid the counterproductive results likely to arise from a dissuasive strategy. Table 7 reveals that dissuasions success is in fact most likely to occur when a combination of several policy tools are employed simultaneously. However, the 2002 NSS and 2001 QDR do not describe dissuasion in this manner. Instead, both documents focus on increasing military superiority to such a high level that the enemy or allies give up weapons development. Unfortunately, the conditions are not present for this policy as currently defined to succeed.

Nevertheless, the concept of dissuasion offers the possibility that other more costly defense policy goals may not be required as often in the future or that they may become stronger when considered as a packaged strategic plan. The strategy of

[118] "Survey of Space Weapons System Employment by the 50th Space Wing in Support of OIF," para. 4.6

dissuading other states from entering into an arms race has the potential benefit of reducing the need to deter or defeat an adversary in the future, and anything that saves money and lives is worth investigating. The need for this type of policy is compelling, but its use to prevent a space arms race is likely to fail and inevitably create a whole range of offensive counter space (OCS) systems that seek to disrupt the enormous advantage of space operations enjoyed by America. Consequently, any potential conflict with China would see U.S. ships forced to elude subs, U.S. air forces dodging SAMs, and U.S. space systems interrupted by jammers targeting their links.

B. POLICY ASSESSMENTS AND RECOMMENDATIONS

Still, opportunities exist to reduce the threat to U.S. space systems. This thesis has highlighted several areas where dissuasion seems promising and after reviewing the necessary conditions (reference Table 7), the U.S. can take steps to slow the development of Chinese counter space systems, increase the protection of American space systems, and "manage the rise of China."

1. Strategy

As a strategy, dissuasion may not provide the same level of clarity in application as other defense policies. In addition, it is highly unlikely that American technological superiority can be harnessed in such a manner that potential adversaries give up pursuing their own security interests. No state has done this. Nonetheless, this is exactly what is proposed in the 2005 NDS. The U.S. fighter aircraft fleet is far superior to any other air force in the world. However, this does not stop other states from developing fighters, nor does it prevent them from developing systems to counter this superiority. The SAMs proliferating the globe demonstrates the inevitable pushback approaches undertaken by states confronted with an adversary who possesses superior air power. Similarly, the U.S. Navy enjoys dominance on the seas, but this does not dissuade other states from pursuing naval build up. In fact, it increases the likelihood that others will follow suit. Look no further than the build up of the PLA Navy (PLAN). Beijing is pursuing a blue water force capable of protecting and maybe even projecting Chinese influence certainly within the Asia-Pacific and possible beyond.

The Strategic Defense Initiative (SDI) put forth by President Reagan in 1983 is poor evidence that a policy of dissuasion can work. It is debatable at best that SDI caused the USSR to do anything, let alone to concede the arms race or bow out of the Cold War. First, SDI in 1983 was far from being technologically feasible. In fact, even given current technology, ground-based ABM systems have proven less than reliable. Moreover, as ABM technologies proceed upwards, costs and challenges soar. The Airborne Laser (ABL) under development at Edwards Air Force Base (AFB) California is considerably further behind in research and development than the ground-based concepts frequently tested over the Pacific Ocean.[119] To go one step further and try to mount an ABM system aboard a satellite would require vast sums of money and technological breakthroughs. Therefore, any belief that SDI caused the USSR to pause and reconsider its interests is doubtful. Second, even if SDI could have been developed and tested to some degree of reliability, it is also argumentative that it necessarily caused the Soviets to "give up."[120]

China and space weaponry are no different today than the USSR and SDI relationship was in 1983. China will pursue whatever is in its best interests, and it will not back down or give up simply because the U.S. fields its own arsenal of space weapons. *Therefore, as a strategy, dissuasion's success is more about diplomatic and economic partnerships and less about military superiority.*

2. China's Rise

Specific to the rise of China, dissuasion has already proved of little utility. The U.S. has attempted to dissuade China from solving the Taiwan issue militarily. However, the Chinese continue to pursue a military capable of overrunning Taiwan, amphibious assault forces, a blue water navy, advanced SAM, and counter space weaponry. Beijing also continues to make strong and even provocative statements about Taiwanese independence. In light of these actions, it appears that dissuasion is failing.

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[119] Airborne Laser, Boeing Integrated Defense Systems, 2 Apr 05. http://www.boeing.com/defense-space/military/abl/flash.html (accessed 30 May 05)

[120] For an in-depth look at the political environment surrounding the development of SDI read Strobe Talbot, *The Master of the Game: Paul Nitze and the Nuclear Peace*. (New York: Alfred A. Knopf, Inc., 1988)

The opportunities for dissuasion to succeed with respect to China are similar to those stated in the previous section. Efforts by Washington to dissuade PLA actions and instead channel its efforts in directions more favorable to America are not realistic. This is especially true given China's growing economy, military modernization, and increasing partnerships with other states. However, U.S. strategists are compelled to do something to protect American influence abroad. Britain faced a similar dilemma when it began to fall from its position as global hegemon during the first half of the twentieth century. Unfortunately, Washington is slowly realizing, much like Britain's leadership, that only so much can be done to protect these high levels of power.

Britain's fall from power was a direct result of the changing international system. The demise of mercantilism, the slow erosion of colonialism, and the industrial revolution combined to create an environment where British naval mastery simply could no longer control the international order in the same manner as it enjoyed previously. Today, American dominance of the international system sits upon a precipice and many theorists argue over if or when China will assume the position of global hegemon. Others debate whether U.S. policies can do anything about the changing dynamics of the world order.

The designers of dissuasion are attempting to delay or possibly even secure indefinitely America's position on top of the world. However, dissuasion will not slow down China's economic growth, derail its global influence, or channel its security interests somewhere considered more favorable to the U.S. *Therefore, it is in Washington's best interest to promote institutions (e.g., United Nations, World Trade Organization, etc.) that will sustain significant levels of influence even if the PRC should become a greater power.*

3. Chinese Space Weapons

The U.S. has the most to lose in a conflict that physically destroys space-based platforms. The forthcoming release of President Bush's space policy will shed a little light on this subject, but some speculate that this policy, like his predecessor's, will leave

the door open for space-based weapons.[121] By itself, this is not cause for alarm, but in conjunction with the pre-emptive nature that the administration approaches international relations, it is less than certain that the U.S. will leave space free of destructive devices.

American forces clearly have the most to lose should space systems be subject to destruction or negation. Moreover, the cost relative to strategic value gained by weaponizing space to insure these systems is significantly more than can be justified. Furthermore, the technology required to field space weapons is theoretical at best. Granted, the fact that U.S. forces do rely on space so much is a compelling argument to field OCS systems in an effort to protect this reliance. In addition, if it were affordable and doable, then weaponizing space would be a plausible option.

> Despite U.S. economic and technological advantages, an unrestrained space race would impose significant costs and produce few lasting strategic advantages unless the U.S. can dominate both offensively, by destroying an adversary's space assets, and defensively, by protecting U.S. space assets.[122]

However, this is not the case, and when combined with the self-induced strains placed on U.S. persona within the international community, it seems that any diplomatic weight that the U.S. may have at one time possessed has been eroding over the last few years. In essence, if Washington would stop breaking the China in the China Shop, then it may have an opportunity to cash in on its diplomatic influence and convince others that its space policy is in everyone's best interests.

From a strategic perspective, collaboration may reduce the chance of a future conflict, although this has not always been the case. Nonetheless, open communication, shared interests, and a better understanding of each other can go a long way toward reducing tensions. Furthermore, from the tactical perspective, joint space ventures would complicate any attempts by the PLA to target U.S.-only space systems. Granted, it would be impossible to make everything joint, but SATCOM, navigation, and weather systems

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[121] Sean Kay and Theresa Hitchens, "Bush Policy would Start Arms Race in Space," Center for Defense Information (CDI) Space Security, 25 May 05. http://www.cdi.org/program/document.cfm?DocumentID=3022&StartRow=1&ListRows=10&appendURL=&Orderby=D.DateLastUpdated&ProgramID=68&from_page=index.cfm (accessed 29 May 05)

[122] Phillip Saunders, "China's Future in Space"

make a good springboard for such an undertaking and would limit the number of targets available to the PLA should they consider embarking on firing a space weapon.

The European Union, Brazil, and others are already working with Beijing on developing new space systems. Washington has allowed some limited U.S. involvement in China's space program, but may need to reconsider its position and make the Chinese market even more accessible. Therefore, *Washington should avoid a space policy that encourages weapons in space and discourages Sino-American space collaboration as a means to dissuade Chinese space programs and protect American systems.*

C. FINAL THOUGHTS

As a master of warfare, Sun Tzu sought to describe the difficulties of conflict in a simplistic manner. The outcome was his writings *The Art of War*, a list of principles or rules by which to guide the application of force. The rationale follows that by simplifying the complexities of war; warriors can more easily recall and apply time-tested truths in the heat of battle. The challenge though of embarking on this process is that when one whittles down these complexities into a few short statements, it is possible to lose important characteristics that do not readily or easily simplify. Furthermore, even if one has uncovered the optimal list of guiding truths, he must be able to translate, merge, and employ these truths in a coherent manner. This then represents the art of *The Art of War*, the ability to meld the appropriate principles of war into an effective strategy.

One of Sun Tzu's beliefs was that avoiding battle should be considered of great importance.

> Thus, those skilled in war subdue the enemy's army without battle. They capture his cities without assaulting them and overthrow his state without protracted operations.[123]

This is consistent with many of his other beliefs, such as taking the state "intact," "captur[ing] the enemy is better than destroy[ing] it," and to "subdue the enemy without fighting is the acme of skill."[124] Furthermore, these beliefs highlight a common theme

[123] Sun Tzu, *The Art of War*. Translated by Samuel Griffith. (New York: Oxford University Press, 1963). p. 79

[124] Ibid, p. 77

that prescribes the use of a strong military to force enemy capitulation. That the possession of equally matched adversaries only serves to invoke combat.

This belief is similar to the policy of dissuasion espoused by U.S. strategists in recent high-level documents and discussed within this thesis. It is apparent in the statements and policies of the current U.S. administration that it should and will utilize its relative strength to sustain its own security. In the words of Brad Roberts

> Dissuasion must work for the best, even as it helps to hedge against the worst in future major power relations.[125]

Andrew Scobell describes China's strategic thought as being dual natured. On one hand, it is "conflict averse" and undertakes defensive-minded approaches to international relations. On the other hand, PRC leaders seem to enjoy using the PLA to deal with conflicts or disturbances in the system.[126] Another PRC expert, David Lai, uses the Chinese game of 'Go' to describe the nuances of Beijing's stratagems. Instead of approaching China with an American football approach that emphasizes force on force or chess mindset, which encourages power plays, it would be wise to consider the manner by which Chinese tend to construct strategy. The game of 'Go' emphasizes winning strategies that rarely achieve annihilation of the enemy but rather see tactics that lead to relatively small differences between the winner and loser.[127]

Lai recognizes the troublesome nature of trying to label China with some sort of exacting degree of confidence. Nonetheless, his estimate is that Beijing is seeking to re-establish China's role as a great power. In addition, PRC leaders are adamant that Taiwan reunify.[128] Scobell and his own assessment on Chinese strategy is simply the means by which China's leaders will attempt to accomplish these objectives. However, it seems likely that these objectives will inevitably conflict with those of the U.S.

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[125] Brad Roberts, "Dissuasion and China"

[126] Andrew Scobell, "China and Strategic Culture," Strategic Studies Institute (SSI), Carlisle Barracks, PA, May 02. http://www.carlisle.army.mil/ssi/pubs/display.cfm?PubID=60 (accessed 29 May 05)

[127] David Lai, "Learning from the Stones: A *Go* Approach to Mastering China's Strategic Concept, *Shi*," Strategic Studies Institute (SSI), Carlisle Barracks, PA, May 04. http://www.carlisle.army.mil/ssi/pubs/display.cfm?PubID=378 (accessed 29 May 05)

[128] Personal interview with the author. Air War College, Air University, Maxwell AFB AL, 16 Mar 05

Regardless, based on recent statements from Washington, America will continue to use more force-on-force type strategies to achieve its own objectives.

> America has, and intends to keep, military strengths beyond challenge thereby, making the destabilizing arms races of other eras pointless, and limiting rivalries to trade and other pursuits of peace.[129]

However, no matter the depth of analysis one thing is clear with respect to dissuasion. It is going to be difficult policy to implement and even more difficult to classify as a success or failure. While this thesis attempted to clarify the meaning of dissuasion, it also reaffirmed the notion that this concept is difficult to grasp. This is due in no small part to the lack of literature on the subject to include sparse guidance from its designers. Another factor contributing to its elusiveness is that it tries to straddle the fence in the same manner as the détente policies instituted by President Nixon during the early 1970s.

> Détente as a state of existence that combined both conflict and cooperation was more difficult to understand than the Cold War. It was easier to explain a relationship that was essentially one of confrontation or cooperation.[130]

As discussed in Chapter II and depicted in Figure 2, dissuasion addresses issues in the middle of the spectrum where the classification of friend or foe becomes difficult to ascertain. In fact, in retrospect it may be more appropriate to illustrate a defense policy spectrum where deterrence and defeat occupy one end of the spectrum and assurance the other, while dissuasion wanders in the middle, much like Nixon and Kissinger's version of détente.

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[129] President Bush, Remarks at 2002 West Point Graduation, Whitehouse Press Releases, 1 Jun 02, http://www.whitehouse.gov/news/releases/2002/06/20020601-3.html, (accessed 21 May 05)

[130] Steven Hook and John Spanier, *American Foreign Policy Since WWII*, p. 159

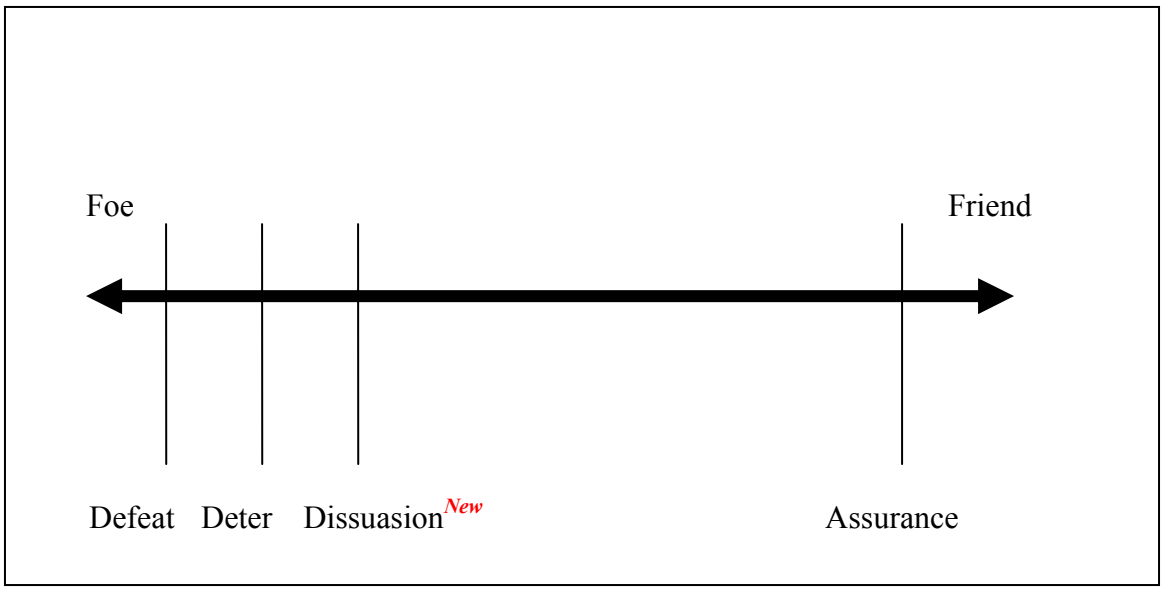

Figure 14. Modified Defense Policy Spectrum

In sum, this thesis prescribed a simplified set of conditions necessary to attain dissuasion, although it does not imply that they are sufficient for this policy to succeed. Instead, dissuasion, which is really the ability to avoid war, must also account for the nuances of defense policies. Therefore, the art of dissuasion and its viability as a strategy to stem the tide of space weapons procurement is tough to discern. Indeed, U.S. policy makers will likely hedge one way or the other, either towards a more deterrence-oriented policy through the advocating of U.S. space weapons and the protection these systems may provide or through an assurance focused strategy that fosters international norms against the weaponizing of space and the inherent protection that this policy affords U.S. systems.

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APPENDIX. HISTORICAL PROGRESSION OF SPACE CAPABILITIES[131]

Understanding the means by which America earned its dominating position in space will help illustrate why this may be seen as a tantalizing target for would be adversaries. The manner by which space systems evolved directly influenced the lack of space-based weaponry and resulted in the only domain of military operations where critical U.S. security interests remain physically defenseless. Furthermore, the intertwined nature of space systems and nuclear arms has significantly affected U.S. defense policies since the first successful launch of a CORONA satellite on August 10 1960.

A. EARLY THEORIES OF ROCKETRY

Explorers have always sought to discover new and uncharted areas and space simply afforded one more domain which man could conquer. However, disinterested governments and the lack of convenient and widespread global communications left the early space researches in relative obscurity as well as isolation from one another. A German named Herman Ganswindt was one of the first scientists to publish space related research when in 1891 he produced a theoretically sound design for a spaceship. Sadly, he spent most of his life producing disappointing airships and espousing scientific theories deemed unacceptable by his more pragmatic contemporaries.[132] In 1883, a Russian named Konstantin Tsiolkovsky described in detail and with sound mathematical support the notion that rockets could place satellites into earth orbit. To arouse popular interest, between 1893 and 1896, he penned two short stories titled *An Imaginary Journey to the Moon* and *Is there Life on Other Worlds?*. The 1903 publishing of his first complete manuscript, *The Exploration of Cosmic Space by Rocket*, highlighted Tsiolkovsky's work.[133] A few years later an American, Robert Goddard would also

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[131] For a comprehensive analysis of space age developments read Walter A. McDougall, *...the Heavens and the Earth: A Political History of the Space Age*. (New York: Basic Books, Inc., 1985)

[132] Heinz Gartman, *The Men Behind the Space Rockets*. (New York: David McKay Company, Inc., 1956), pp. 31-32

[133] Ibid, pp. 16, 25

study rocketry and by 1912 proved that liquid propelled rockets could actually work in a vacuum like space. In 1919, Goddard's published work titled *A Method of Attaining Extreme Altitude* laid the foundation for American rocket developments and by 1929 he had demonstrated the practicality of placing sensors on-board rockets to collect weather measurements. Interestingly, neither of these early space advocates received much attention for their work. In fact, Tsiolkovsky was thought to be eccentric by his fellow scientists and conducted his research without any funding. Similarly, Goddard worked in relative obscurity, although he did receive some limited funding through Charles Lindberg and the Guggenheim Foundation. Soon though, space technology was about to get a substantial boost in interest from the highest levels of government.

B. "VERGELTUNG" (VENGEANCE!)

In 1932, Adolph Hitler directed his German scientists, most notably Wernher von Braun, to change course on their research and focus on rockets as weapons and not simply futuristic exploration vehicles. As a result, the *Vergeltung* weapon V-2 would be unleashed against England on September 8, 1944.[134] This change would profoundly affect the course of space system development and immediately gave rocketry a much more military focus and with it, a sense of urgency absent from previous space endeavors. Furthermore, it gave these initial space zealots the necessary attention and financing to pursue space interests thoroughly. Of course, any focus outside of Hitler's was cause for arrest and even though von Braun "daren't tell Hitler" about his secret plans to convert the V-2 into a manned vehicle with a pressurized capsule instead of a warhead, the Gestapo found out and promptly arrested him and others in his group.[135] Nonetheless, fueled partly by Hitler's militaristic ambitions as well as von Braun's own dreams about space, the V-2 program was instrumental in translating the theories and ideas of Ganswindt, Tsiolkovsky, and Goddard into reality.

Upon overtaking Peenemunde in April 1945, Allied forces quickly seized the V-2 program to include its scientists whom had relocated to Bavaria and shipped them back to

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[134] Heinz Gartman, p. 147

[135] John Trux, *The Space Race – From Sputnik to Shuttle: The Story of the Battle for the Heavens*. (Great Britian: New English Library, 1985), p. 8

America under the program Project Paperclip.[136] In addition, even though the Soviets were left with little hardware to bring back to Moscow, they were able to round up numerous Peenemunde scientists scattered throughout Eastern Europe. The breakup of the German V-2 program at the end of WWII directly contributed to the impending nuclear arms race as both future superpowers eagerly gobbled up the available knowledge and immediately set about improving existing rocket technology. For the American and Soviet scientists involved it was a stark contrast to pre-WWII days when their profession was regulated to small local advocacy clubs that used member's garages and basements to conduct experiments. Instead, this new era afforded them the tools and resources to more thoroughly test and produce rockets.

C. BALLISTIC MISSILES AND THE NUCLEAR ARMS RACE

After the Soviets successfully tested an atomic weapon on August 29, 1949, the nuclear arms race was in full swing. Moreover, the June 1950 North Korean invasion of South Korea, in part supported by the USSR, caused the tensions between Moscow and Washington to reach new levels. Ultimately, President Truman signed National Security Council (NSC) document #68 to articulate the current state of affairs.

> On the one hand, the people of the world yearn for relief from the anxiety arising from the risk of atomic war. On the other hand, any substantial further extension of the area under domination of the Kremlin would raise the possibility that no coalition adequate to confront the Kremlin with greater strength could be assembled.[137]

Pushed by military and political leaders of both superpowers and using knowledge gained from the V-2 program, post-WWII scientists sought to extend the range of ballistic missiles in an effort to improve each belligerent's nuclear capabilities. Initially, the Kremlin took greater interest in ballistic missile development than the Pentagon. One reason that the Americans chose not to aggressively pursue ballistic missile development was that President Truman's lead scientific advisor in the 1940s,

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[136] Heinz Gartman, *The Men Behind the Space Rockets*. p. 148

[137] "A Report to the President Pursuant to the President's Directive of January 31, 1950," (NSC 68), 7 Apr 50, in Foreign Relations of the United States 1950, vol. I (U.S. Government Printing Office (USGPO), 1977), p. 236

Vannevar Bush failed to "see any great future" in them.[138] In addition, early nuclear weapons were simply too big to be delivered by a missile. This delighted early air power advocates and combined with the recent Strategic Bombing Surveys solidified the U.S. air centric position with respect to nuclear weapons delivery.[139] Conversely, for the USSR the ballistic missile was a logical choice because of geographic factors. In addition, The Soviets initially saw rockets as an improved form of artillery, their dominant weapon in their war against Germany. The Americans initially saw rockets as an inferior form of airplane, the dominant weapon in their war against Germany. Interestingly though, the Soviets first capability to reach the U.S. through intercontinental delivered nukes was the Bison and Bear bombers, which became operational in 1956. Still, the Soviets pressed on under the belief that rockets would comprise the foundation of their nuclear forces. Russian nuclear arms expert Pavel Podvig confirms this position.

> Since the Soviet Union, unlike the United States, could not deploy its bombers close to the adversary's borders, delivering nuclear weapons to US territory required the development of intercontinental platforms.[140]

The intense efforts by the Soviets to develop an equalizer to the U.S. bomber force drove the Soviets to develop the ICBM along with a whole family of short and medium range ballistic missiles. Soviet ballistic missiles development surged to such a level that in December 1959 the USSR created an entirely separate service, the Strategic Rocket Forces, to manage these devices. Two of the initial Soviet ballistic missiles, the SS-4 Sandal and SS-6 Silkwood achieved operational status in 1959 and 1957 respectively.[141] While each satisfied ballistic missile requirements; it was their inclusion in other activities that prominently affected future space efforts. In 1962, the Sandal's

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[138] Donald Cox, *The Space Race: From Sputnik to Apollo…and Beyond*. (Philadelphia: Chilton Publishing Co., 1962), p. 19

[139] There were three Strategic Bombing Surveys conducted at the conclusion of WWII. "The US Strategic Bombing Survey (USSBS) - European War," 30 Sep 45, (Washington DC: War Department). Reprinted in *The USSBS*. (Maxwell AFB, AL: Air University Press, 1987). "The USSBS - Pacific War," 1 Jul 46, (Washington DC: USGPO, 1946) and "The Effects of the Atomic Bombing of Hiroshima and Nagasaki," 19 Jun 46 (Washington DC: USGPO, 1946). Reprinted in *The USSBS*, vol VII, (New York; London: Garland Publishing Inc., 1976)

[140] Pavel Podvig, *Russian Strategic Nuclear Forces*. (Cambridge, MA: MIT Press, 2001), pp. 4-8

[141] Ibid, pp. 179, 182

placement in Cuba brought the world to the brink of a global nuclear exchange between the U.S. and Soviets, although the medium range SS-4 missiles were eventually removed from the island as the Soviets realized it did not possess enough nuclear weapons compared to the U.S. to win this atomic standoff.[142] Nonetheless, the Sandal demonstrated advanced capabilities with a range of over 1,000 miles and the strength to carry a one-megaton nuclear warhead.

On the one hand, the outcome of the Cuban Missile Crisis was positive. The belligerents avoided nuclear and conventional war and adversary medium range nuclear missiles were removed from proximity of both states. On the other hand, this crisis further entrenched the belief by both sides that nuclear weapons equaled immense bargaining power. The Soviet leadership immediately embarked on an aggressive program to field a numerically superior nuclear force, primarily consisting of ICBM, in an effort to avoid bargaining from a position of nuclear weakness again.

Another Soviet ballistic missile during this period, the SS-6 Sapwood, demonstrated similar capabilities as the SS-4, but intrigued Soviet scientists more for its potential to carry objects into earth orbit than to carry weapons across the earth's oceans.[143] Ultimately, the Sapwood would become famous on October 4, 1957 when a modified version successfully launched Sputnik-I into orbit. This simultaneous development of space and ballistic missile capabilities dates back to at least as early as 1931 when Hitler sidetracked von Braun from space scientist to ballistic missile expert. Inevitably, the SS-6 proved that ballistic missiles possessed the capacity to carry objects into the earths orbit. Consequently, these rockets provided a means to launch satellites with the capability to monitor American ICBM fields that the Sapwood was also designed to destroy. *Therefore, the rapid development of the Sapwood marked a key point in the fielding of on-orbit space systems since it overcame the initial as well as most significant hurdle to space flight (i.e., space lift).*

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[142] Pavel Podvig, *Russian Strategic Nuclear Forces* p. 6

[143] Ibid, pp. 4-5

D. A NEED FOR SPY SATELLITES

The rapid development and fielding of the Soviet ICBM in light of the Cuban missile crisis caused many reactions in the U.S.

> The military's response was to call for more bombers, more nuclear weapons, and the capability to survive a Soviet first strike and to hit back with a massive retaliatory strike. The Intelligence Community's response was to develop better intelligence on the Soviet Union and to start learning what the Soviets were preparing to do before they actually did it.[144]

Granted, the Soviet testing of a nuclear device in 1949 and the North Korean invasion into the South in 1950 caused Eisenhower to create the initial U-2 program to help better prepare leadership for these types of events. However, the U-2 was starting to show its limitations and simply could not cover the entire expanse of the USSR in a reliable and persistent manner. Moreover, Eisenhower was unable to convince Khrushchev to accept his 1955 Open Skies treatise allowing overhead reconnaissance via aircraft.[145] *In addition, the downing of U-2 pilot Gary Powers in May 1960 highlighted the vulnerability of airborne intelligence and reinforced the idea that space-based photoreconnaissance was needed.* Therefore, at the highest levels of Washington leadership, the foray into space clearly represented the pursuit of necessary and tangible security interests.

Conversely, the Soviets efforts seemed more like attempts to earn broad-based domestic and political pride by achieving hallmark steps in the exploration of space. Certainly, Sputnik's success in 1957 followed by Yuri Gagarin's ride to the cosmos onboard the spaceship *Vostok* in April 1961 translated into a great esteem for the Soviets. They had achieved two significant "firsts" in space exploration with these missions, and although America by 1961 looked to be winning the long-term race, "in the realm of spectaculars-the Soviets still claimed the definitive lead."[146] Nonetheless, this race at first glance appeared to be more about "spectacular" milestones than tangible military

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[144] Dwayne Day, John Logsdon, Brian Latell, *Eye in the Sky: The Story of the CORONA Spy Satellites*, pp. 3

[145] Ibid, pp. 30-31

[146] Donald Cox, *The Space Race: From Sputnik to Apollo…and Beyond*. p. 7

achievements. In fact, immediately following the initial successes of Gagarin's flight the Soviet General Consul confirmed this position by stating that they "are mainly interested in people's excitement and reaction" to space achievements.[147] In the U.S., the apparent Soviet lead in the space race caused mixed feelings.

> The reactions of official Washington amounted to little more than a prolonged yawn that the inevitable had occurred…Some of Washington, however, was disheartened by the news. Although the President formally congratulated the USSR on their latest space endeavor, Congress was not in such a commendable mood.[148]

This ultimately proved beneficial for both sides. The belief that Washington was lagging in space capabilities provided an infusion of interest as well as money into both the less useful but spectacular manned space program and also into the less spectacular but highly useful space reconnaissance program.

> And so the CORONA program moved forward. It proceeded with great haste. In April 1958, with presidential approval, CORONA came to fruition. In the span of a little over a decade, it produced 145 launches at a cost of $850 million and returned 300 million nautical miles of cloud-free photography revealing all of the Soviet missile complexes-medium, intermediate, and long-range; each class of their submarines; a complete inventory of their bombers and fighters; the Soviets' ABM effort; and their weapons storage. It also gave us maps for strategic targeting. More important, it gave our policy makers the confidence to enter disarmament talks and fashion SALT I Treaty. It was a remarkable program.[149]

In the statement above, noted American space expert John McMahon captures the essence of the U.S. interest in space. No doubt, space afforded the U.S. and others incredible advantages across a whole spectrum of uses. Consequently, the greater the advantages became the more that each superpower began to take the first steps to weaponize the highest frontier to deny each other or at least possess the ability to deny each other access to space systems. Beginning in the late 1960s each side began to explore the prospects of anti-satellite weapon systems.

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[147] Donald Cox, *The Space Race: From Sputnik to Apollo…and Beyond*. p. 9

[148] Ibid, p. 6

[149] Quote by John N. McMahon taken from Dwayne A. Day, John M. Logsdon, and Brian Latell, *Eye in the Sky: The Story of the CORONA Spy Satellites*, p. 182

The Soviets first ASAT used an ICBM fitted with an explosive device that released 1,000s of small pellets once it approached its intended satellite target. In addition, the Soviet nuclear-armed *Galosh* ABM interceptor could fulfill the role of ASAT weapon against satellites in specific low earth orbits (LEO). The Americans also investigated a crude ASAT system in the late 1960s but eventually abandoned it in favor of an F-15 launched ASAT system that lingered in existence until the mid-1980s.[150] During this time, the development of ASAT systems may have seemed like simply the natural evolution of space utility. Much like other mediums of operation, it was simply a matter of time before the necessity arose to destroy and therefore protect space-based systems. Interestingly though, ASAT systems did not follow this path and never did produce a true military arms race in space. In fact, to this day space has remained relatively free of weapons. But, why? Moreover, how did this influence the development of future space systems?

One reason why ASAT development did not endear itself to superpower leadership was the potential destabilizing affect it would cause on the tenuous nuclear arms race. ASAT systems that destroyed the adversary's missile warning or communications systems may mean that the aggressor is considering a first-strike. ASAT systems that target remote sensing platforms may imply that one side is covertly trying to change its nuclear lay down, either by moving systems around or fueling up new systems. In either case, it can easily be inferred that ASAT systems are a precursor to a first strike, which might cause a destabilizing influence on the already tricky Cold War. Therefore, the presence and affect of ASAT systems during the Cold War was short lived and of small impact. In addition, the demise of the ASAT re-enforced the notion that space systems best served a critical but nonetheless supporting role to other means of warfare and security. President Johnson highlighted the capability and value of these early space programs.

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[150] Joseph Nye and James Schear, *Seeking Stability in Space: Anti-Satellite Weapons and the Evolving Space Regime*, pp. 7-8

> I wouldn't want to be quoted on this but we've spent 35 or 40 billion dollars on the space program. And if nothing else had come out of it except the knowledge we've gained from space photography, it would be worth 10 times what the whole program cost. Because tonight we know how many missiles the enemy has and, it turned out, our guesses were way off. We were doing things we didn't need to do. We were building things we didn't need to build. We were harboring fears we didn't need to harbor. Because of satellites, I know how many missiles the enemy has.[151]

As the nuclear arms race progressed and the Cold War intensified a broader range of space programs emerged. The deployment of U.S. strategic forces across the globe meant that the U.S. needed a secure and reliable means to communicate strategic directives rapidly, if necessary. With some air bases in austere locations plus submarines constantly on the prowl, landlines simply could not fulfill this requirement. Furthermore, the ability to communicate with strategic bombers in-flight required the fielding of satellite communications (SATCOM). In addition, other space-based systems, such as missile warning, navigation, and weather sensors developed during the Cold War. However, it was not until after the Cold War that U.S. dependency on these systems manifested itself.

[151] Dwayne Day, John Logsdon, Brian Latell, *Eye in the Sky: The Story of the CORONA Spy Satellites,* p. 1

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